EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE-2 DIABETES MELLITUS IN DIABETIC OUTPATIENT DEPARTMENT AT GOVERNMENT RAJAJI HOSPITAL MADURAI

M.Sc (NURSING) DEGREE EXAMINATION

BRANCH – I MEDICAL SURGICAL NURSING

COLLEGE OF NURSING

MADURAI MEDICAL COLLEGE, MADURAI -20.

A dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY,

CHENNAI - 600 032.

In partial fulfillment of the requirement for the degree

MASTER OF SCIENCE IN NURSING

APRIL 2015

EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE-2 DIABETES MELLITUS IN DIABETIC OUTPATIENT DEPARTMENT AT GOVERNMENT RAJAJI HOSPITAL MADURAI

Approved by Dissertation committee on *……*

Professor in Nursing Research _____

Mrs.S.POONGUZHALI M.Sc., (N), M.A., M.BA., PhD
Principal
College of Nursing
Madurai Medical College
Madurai.625020

Clinical Specialty Expert _____

Mrs.J. ALAMELU MANGAI., M.Sc (N)., MBA (HM)
Faculty in Nursing
Department of Medical Surgical Nursing
College of Nursing
Madurai Medical College
Madurai.

Medical Expert _____

Dr. K, SENTHIL M.D.
Professor and Head of Department,
Department of Diabetology,
Government Rajaji Hospital,
Madurai Medical College
Madurai.

A dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY,

CHENNAI - 600 032.

In partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN NURSING

APRIL – 2015

CERTIFICATE

This is to certify that this dissertation titled**, "EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE-2 DIABETES MELLITUS IN DIABETIC OUTPATIENT DEPARTMENT AT GOVERNMENT RAJAJI HOSPITAL MADURAI."** Is a bonafide work done by **Mrs. P.RAMJAN BEGAM,** M.Sc (N) student, College of Nursing, Madurai Medical College, Madurai - 20, submitted to **THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32** in partial fulfillment of the University rules and regulations towards the award of the degree of **MASTER OF SCIENCE IN NURSING**, **Branch-I, Medical Surgical Nursing** Under our guidance and supervision during the academic period from 2013 – 2015.

Mrs. S.POONGUZHALI, M.Sc. (N).,
M.A., MBA., Ph.D.,
PRINCIPAL
College of Nursing,
Madurai Medical College,
Madurai- 625020.

CAPTAIN Dr.B.SANTHAKUMAR,M.Sc(F.Sc).,
MD(F.M).,PGDMLE,Dip.NB(F.M)
DEAN
Madurai Medical College,
Madurai- 625020.

CERTIFICATE

This is to certify that this dissertation entitled**, "EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE-2 DIABETES MELLITUS IN DIABETIC OUTPATIENT DEPARTMENT AT GOVERNMENT RAJAJI HOSPITAL MADURAI."** Is a bonafide work done by **Mrs. P.RAMJAN BEGAM**, **M.Sc (N)** student, College of Nursing, Madurai Medical College, Madurai - 20, in partial fulfillment of the University rules and regulations for award of **MASTER OF SCIENCE IN NURSING**, **Branch-I, Medical Surgical Nursing** Under my guidance and supervision during the academic period from 2013 – 2015.

Name and signature of the guide _____

Mrs.J. ALAMELU MANGAI., M.Sc (N)., MBA (HM)

Faculty in Nursing
Department of Medical Surgical Nursing
College of Nursing
Madurai Medical College
Madurai.625020

Name and signature of the Head of Department_____

Mrs.S.POONGUZHALI M.Sc. (N), M.A, M.B.A., Ph.D.
Principal,
College of Nursing,
Madurai Medical College,
Madurai.625020

Name and signature of the Dean _____

Captain Dr.B.SANTHAKUMAR, M.Sc, F.Sc.,M.D(FM),PGDMLE,Dip.N.B(FM),
Dean,
Madurai Medical College,
Madurai.625020

ACKNOWLEDGEMENT

"At times of sorrow all think about God but during their happy moments none do it. There will be no shadows of sorrow if one thinks about God even during his/her happy moments"

-A. Mizbah

Nothing concrete can be achieved without an optimal inspiration during the course of work. There are several hands and hearts behind this work to bring it to this final shape for which I would like to express my gratitude. I wish to acknowledge my sincere and heartfelt gratitude to **GOD ALMIGHTY** of his marvelous grace shown from the beginning to the end of the study.

The encouragement is a booster of the human life without this anyone can achieve easily. I thank everyone encouraged me to achieve to complete this task effectively.

I would like to express my deep and sincere gratitude to **CAPTION.Dr.B.SANTHA KUMAR, MSC(FSC)., MD(FM)., PGDMLE., DIPNB (FM)., Dean, Madurai Medical College, Madurai,** for granting me permission to conduct the study in this esteemed institution.

I express my heartfelt thanks to my research guide **Mrs. S. POONGUZHALI., M.Sc., (N), M.A., M.BA. PhD., Principal, College of Nursing, Madurai Medical College, Madurai** for granting permission to conduct the research and for providing her continuous support, constant encouragement and valuable suggestions helped in the fruitful outcome of this study.

I extend my heartfelt and faithful thanks to my clinical Specialty Guide **Mrs.J.ALAMELU MANGAI., M.Sc (N)., MBA (HM)** for her effortless hard work, interest and sincerity to mould this study in a successful way.

I deem it a great privilege to express my sincere gratitude and deep sense of indebtedness to my esteemed teachers **Mrs. P. GOKILAMANI, M.Sc (N). Lecturer in Nursing, Mrs.S.MUNIAMMAL., M.Sc (N), Mrs. S. SUROSEMANI, M.Sc (N) Mrs. R. RAMA., M.Sc (N)** Faculties in Medical and Surgical nursing, for her timely assistance and guidance in pursuing the study.

My deep sense of gratitude to **Dr.K.SENTHIL M.D.** Professor and Head of Department, Department of Diabetology, Government Rajaji Hospital, Madurai for giving permissions and also for his valuable suggestions and guidance to complete this study.

My sincere thanks to **Dr.E.SUBBIAH EAGAPPAN M.D.D.DIAB.,** Senior Assistant Professor, Department of Diabetology, Government Rajaji Hospital, Madurai for giving his valuable suggestions and guidance to complete this study.

I extent my special thanks to **ALL THE FACULTY MEMBERS of College of Nursing, Madurai Medical College, Madurai.** -20 for the support and assistance given by them in all possible manners to complete this study.

It is my pleasure and privilege to express my deep sense of gratitude to **Dr.VADIVEL MURUGAN,MD., Professor and HOD of Medicine, Dr.Mrs. SARASRINISHA., M.Sc (N).,PhD. Reader in nursing,** Rani Meyyammai College of Nursing, Annamalai University. **Mrs.G.JAYA THANGASELVI, M.Sc (N). Professor**, Head of the Department, Medical and Surgical Nursing. CSI Jeyaraj Annabackiam College of Nursing, Madurai. **Mrs.G. SUMATHI**, **M.Sc (N)Associate professor,** Dhanalakshmi Srinivasan College of Nursing. Perambalur. **Mr. ANAND**, **M.Sc (N).Lecturer,** College of nursing, NEIGRIHMS, Shillong for validating tool for this study.

I wish to express my sincere thanks to **Mr. MANI VELUSAMY, M.Sc (STATISTICIAN)** for extending necessary guidance for statistical analysis.

I also thanks to **Mr. T. VENKATESH M.A**. English Literature, for her help in editing the Manuscript.

I wish to express my sincere thanks to **Dr**. **MRS. NAGANANDHINI, M.A., M.Phil., Ph.D. Tamil Professor, MVM Govt College** for her help in editing the Manuscript.

I express my thanks to **Mr. KALAI SELVAN**, **M.A,** Librarian**, College of Nursing, Madurai** for his cooperation and assistance which build the sound knowledge for this study and also to the **Librarians of Madurai Medical College**

and Tamilnadu, Dr.MGR Medical University, Chennai for their co-operation in collecting the related literature for this study.

I wish to thank to the **staff nurses** of department of Diabetology at Government Rajaji Hospital, Madurai who have extended their cooperation during the study.

I would like to express my deepest thanks to all the **Diabetes patients,** Government Rajaji hospital, Madurai, who had participated in the study without them it would have been impossible to complete this study.

I owe my great sense of gratitude to **Mr. R. RAJKUMAR B.Com Sai graphics**, for their enthusiastic help and sincere effort in typing the manuscript with much value computer skills and also for the translation of the tool.

A word of appreciation to **laser computer zone** for untiring, innovative, diligent effort for carefully printing my dissertation.

I am indebted a lot to the sacrifices of my beloved family members for their immense love, support, prayer and encouragement inspired me to reach at this point in my life.

My grateful thanks to my beloved husband **Mr. M. SYED ABDHAHIR, DEEE., BBA** and my lovable son **S.R. PARWESH MOHAMMED** for their love, support and constant encouragement throughout this study.

I express my heartiest gratitude to my mother **Mrs. P. MYMOON BEEVI.** for their cooperation ,support and guidance during my career.

I express my thanks to my sister **Mrs.P. GURCHITH BEGUM** and her son **Mr. M. MOHAMED HARRIS OLI. DEEE.,** for their love, concern, encouragement and sincere support all through my study.

Last but not least I express thanks to my friends who encouraged and supported me to complete the study.

ABSTRACT

Title: Effectiveness of brisk walking exercise on glycemic level among patients with type-2 Diabetes mellitus in diabetic Outpatient Department at Government Rajaji Hospital Madurai. **Objectives:** Assess the glycemic level among patients with type 2 diabetes mellitus at Diabetic outpatient Department, Government Rajaji Hospital, Madurai. Evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type 2 diabetes mellitus in the experimental group. Associate the glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variables. **Hypothesis:** There is a significant difference in the glycemic level among the patients with type 2 diabetes mellitus before and after brisk walking exercise. There is a significant association between the glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variables. **Conceptual Framework:** Modified Widenbach's helping art of clinical nursing theory. **Methodology;** A quantitative, true experimental pre test – post test control group design was used, and study was conducted at diabetic OPD in Government Rajaji Hospital, Madurai-20. Sample size was 60, 30 in each group, assigned by simple random sampling. Bio-physiological tool was used to measure the pre test glycemic level. The intervention was brisk walking exercise, 30 minutes per day for 28 days. On the 29^{th} day the post test was done by same tool. The data were collected, tabulated and analyzed by descriptive and inferential statistics. **Findings**: The obtained 't' value 12.58 was statistically highly significant at $P<0.001$ level by using paired 't' test**.** The results suggest that brisk walking exercise is effective management for Type-2 Diabetes Mellitus. **Conclusion:** The study findings proved that the brisk walking exercise reduces the fasting glycemic level among patients with type-2 Diabetes mellitus.

TABLE OF CONTENTS

CHAPTER	CONTENTS	PAGE NO
I	**INTRODUCTION**	
	1.1 Need for the study	17
	1.2 Statement of the problem	14
	1.3 Objectives	14
	1.4 Research Hypotheses	14
	1.5 Operational definitions	15
	1.6Assumptions	15
	1.7 Delimitation	16
	1.8 Projected outcome	16
II	**REVIEW OF LITERATURE**	
	2.1 Reviews related to various factors for diabetes mellitus	18
	2.2 Reviews related to various therapies on glycemic control for Type-2 diabetic mellitus.	23
	2.3 Reviews related to the effect of brisk walking on Type-2 diabetes mellitus	29
	2.4 Conceptual framework	35
III	**RESEARCH METHODOLOGY**	
	3.1 Research Approach	40
	3.2 Research design	40
	3.3 Research Variable	41
	3.4 Research Setting	41
	3.5 Population	41
	3.6 Sample	42
	3.7 Sample size	42
	3.8 Sampling technique	42
	3.9 Criteria for sample selection	42
	3.10 Development and description of the tool	43

CHAPTER	CONTENTS	PAGE NO
	3.11 Content Validity	44
	3.12 Reliability of the tool	44
	3.13 Pilot study	45
	3.14 Procedure for data collection	45
	3.15 Plan for data analysis	46
	3.16 Ethical consideration	46
IV	**DATA ANALYSIS AND INTERPRETATION**	49
V	**DISCUSSION**	79
VI	**SUMMARY, CONCLUSION, IMPLICATIONS RECOMMENDATIONS AND LIMITATIONS**	
	6.1 Summary of the study	88
	6.2 Major findings of the study	90
	6.3 Conclusion	91
	6.4 Implications	91
	6.5 Recommendations	94
	6.6 Limitations	94
	REFERENCES	95
	APPENDICES	103

LIST OF TABLES

TABLE. NO	TITLE	PAGE NO
1.	Distribution of the demographic variables	51
2.	Distribution of diabetes mellitus related variables	58
3.	Distribution of Pretest fasting glycemic level	66
4.	The mean value of pretest fasting glycemic level	68
5	Effectiveness of brisk walking exercise	69
6.	Distribution of Pretest and posttest fasting glycemic level.	70
7.	Comparison of pretest and posttest score of fasting glycemic level.	72
8.	Association between post test glycemic level and demographic and clinical variables (control)	75
9.	Association between post test glycemic level and demographic and clinical variables (experimental)	77

LIST OF FIGURES

FIG.NO	TITLE	PAGE NO.
1.	Conceptual frame work based on Widenbach's helping art of clinical nursing theory	39
2.	Schematic presentation of Methodology.	48
3.	Distribution of subjects according to age	54
4.	Distribution of subjects according to gender.	55
5.	Distribution of subjects according to educational status	56
6.	Distribution of subjects according to nature of job.	57
7.	Distribution of subjects according to duration of illness	61
8.	Distribution of subjects according to drug for diabetes mellitus.	62
9.	Distribution of subjects according to type of diet.	63
10.	Distribution of subjects according to the diet for Diabetes mellitus.	64
11.	Distribution of subjects according to body mass index	65
12.	Distribution of pretest fasting glycemic level	67
13.	Comparison of pretest and posttest glycemic level	71
14.	BOX-PLOT Comparison of pretest and posttest glycemic level	74

LIST OF APPENDICES

APPENDIX NO	TITLE
I	Letter seeking and granting permission to conduct the study in Government Rajaji Hospital, Madurai
II	Ethical committee approval letter
III	Content validity certificate
IV	Informed consent form
V	Research Tool – English
VI	Research Tool – Tamil
VII	English Editing Certificate
VIII	Tamil Editing Certificate
IX	Procedure
X	Training Certificate for Brisk walking exercise
XI	Photographs

LIST OF ABBREVIATIONS

DM	**-**	**Diabetes Mellitus**
OPD	**-**	**Out Patient Department**
BMI	**-**	**Body Mass Index**
WHO	**-**	**World Health Organization.**

Introduction

CHAPTER I

INTRODUCTION

"Every human being is the author of his own health or disease."

-Sri Budha.

"Take a walk! Walking is an easy! Effective and low-cost form of aerobic exercise for people with type 2 diabetes. ."

By Dennis Thompson Jr.

Diabetes Mellitus is a global problem with devastating human, social and economic impact. Diabetes mellitus is the fourth leading cause of death in most developed countries. Type 2 diabetes is a growing problem throughout the world. It is projected that the incidence rate of this disease will double by 2030. The prevalence of diabetes among adults was estimated to be around 285 million (6.4%) in 2010, and expected to reach 439 million (7.7%) by 2030. India leads the world with 50.8 million diabetics, followed by China with 43.2 million. Since past two decades, when compared to the developed countries, there has been a disproportionate increase in diabetes prevalence rate in developing countries. This can be attributed to population growth, aging, urbanization, obesity, physical inactivity and hereditary nature of the disease. Type 2 DM accounts for 85 to 95% of all diabetics in high income countries, and an even higher percentage in low- and middle- income countries.

Diabetes Mellitus is defined as a chronic disorder characterized by abnormalities in the metabolism of carbohydrates, protein and fat. In the last two decades, there has been a marked increase in the prevalence of diabetes among urban Indians. (Lewis, 2011).The insulin is essential for cellular metabolism as well as for the proper mechanism of protein and fat. Without insulin, plasma glucose

concentration rises and glycosuria results. Deficits in insulin production may in the beta cell of the pancreas or inadequate utilization of insulin by the cell.

There are several classifications of diabetes mellitus. They may differ in cause, clinical course and treatment.

According to the ADA (American Diabetes Association, 2004), the major classifications of diabetes are

- Type-1: Insulin dependent diabetes mellitus (IDDM) and Juvenile diabetes mellitus.
- Type-2 : Non-insulin dependent diabetes mellitus (NIDDM) or adult onset diabetes mellitus
- Pre-diabetes
- Diabetes mellitus associated with other conditions
- Gestational diabetes mellitus (GDM)

Diabetes is a major cause of heart disease and stroke. Death rates for heart disease and the risk of stroke are about 2–4 times higher among adults with diabetes than among those without diabetes. In addition, 67% of U.S. adults who report having diabetes also report having high blood pressure.

According to World Health Organization (2010) at least 171 Million people world-wide will suffer from diabetes. Its incidence increases rapidly and it is estimated that by the year 2030 this number will almost double. Diabetes Mellitus occurs, throughout the world but it is more common (especially) in the more developed countries. The greatest increase is in Asia and Africa where most patients will probably be found in 2030. The increased incidence of diabetes in developing

countries follows the trend of urbanization and life style changes, perhaps most importantly a western style diet.

Global prevalence of diabetes (2010) reported that the prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The prevalence of diabetes is higher in men than women. In India, there are more women with diabetes than men.

According to American Diabetes Association, the average medical expenses are more than twice as high for a person with diabetes as they are for a person without diabetes. In 2007, the estimated cost of diabetes in the United States was $174 billion. That amount included $116 billion in direct medical care costs and $58 billion in indirect costs (from disability, productivity loss, and premature death).

According to ADA-(2009)1 in 3 Americans born after 2000 will have diabetes in their life time. Diabetes is the major cause of blindness in adults aged 20-24 years as well as the leading cause of non-traumatic lower extremity amputation and end stage renal disease.

In India, an estimated number of diabetes is around 50.8 million and also India is the capital of the world for diabetes. This means that India actually has the highest number of diabetes of anyone country in the world. And also impaired glucose tolerance is also a mounting problem in India. The crude prevalence rate in the urban areas of India is 9% and approximately 3% of the total population in rural areas.

According to the third edition of diabetes atlas of the International Diabetes Federation (IDF), India accounts for 40.9 million diabetic in the age group of 20-79

years, topping the global chart, followed by China, USA &Russia. Even worse in the projected year of 2025 with 69.9 million diabetes in India (Serena Josephine, 2007).

According to the Indian Council of medical research INDIAB (India diabetes) nationwide study said that **o**ne out of 10 people in Tamil Nadu are diabetic, and every two persons in a group of 25 are in the pre-diabetic stage. This means that about 42lakh individuals have diabetes and 30 lakhs people are in pre-diabetes stage.

Obesity is a growing health concern among all ages with the prevalence of obesity among 20-74 years increasing from 15% in 1980 to 32.9% in 2004 (Centers for Disease Control and Prevention [CDC], 2010). One of the main reasons for diabetes is, the people gain weight due to the lack of caloric balance. To maintain a healthy caloric balance people, need to consume around the same number of calories that the body uses in one day. Environment is another important factor of weight gain. Instead of eating fast food and watching television, people need to exercise and eat a well -balanced diet. Another reason, genetics has been shown to have an impact on diabetes mellitus. Diabetes mellitus can lead to serious health problems including Kidney disease, heart disease, hypertension, neuropathy, retinopathy, nephropathy peripheral vascular diseases (CDC, 2010). These are all serious health risks, but type 2 diabetes is one, it is projected that the worldwide incidence of type 2 diabetes will rise from 171 million people to 366 million by the year 2030 (Colberg, 2008). Type 2 diabetes is a subtype of diabetes and accounts for 90-95% of all cases of diabetes (Colberg, 2008). The primary goal of diabetes management is to control blood glucose within normal levels. There are risk factors that increase blood glucose levels such as age, obesity, body fat distribution, dietary factors, genetic factors, cardio-respiratory fitness, and physical inactivity that need to be addressed in order to

improve and prevent type-2 diabetes. (Colberg, 2008). Regular exercise, along with diet and medication, has been identified as one of the three components of effective diabetes therapy. Regular exercise can help reduce potential side effects of type 2 diabetes mellitus including kidney disease, lower limb amputations, heart disease, nerve damage, blindness, and even death (Colberg, 2008). Exercise is a cornerstone of diabetes treatment because it helps reduce the risk of developing insulin resistance and glucose intolerance (Colberg&Grieco, 2009).

The public health burden due to diabetes is apparent by the fact that diabetes is the leading cause of blindness, chronic renal disease and non-traumatic limb amputations, more importantly. Diabetes is the leading cause of coronary artery disease, stroke and peripheral vascular disease. 75% of the mortality in diabetics is due to coronary artery disease and stroke. Hence the economic burden imposed by diabetes is enormous. Once established the disease is difficult to treat; there is a direct relationship to uncontrolled diabetes and the development of its long term complications. It is often difficult to achieve optimal glycemic control. Hence it is important that we should strive hard to achieve primary prevention of type 2 diabetes. **(BK Sahay, RakeshSahay, *Hyderabad 2010,Public Health Department).***

The Indian Diabetes Prevention Program (IDPP) a preventive study based on the Diabetes Prevention Program has clearly demonstrated the importance of physical activity in the prevention of diabetes in Indians. The therapeutic goal for diabetic management is to achieve normal blood glucose levels without hypoglycemia while maintaining a high quality of life. About 80 % of type-2 diabetes is preventable with five components such as nutritional therapy, exercise, monitoring, pharmacologic therapy and education. Yet, without effective prevention and control programs, the

incidence of diabetes is likely to continue rising globally. **(Brunner & Siddhartha's, 2010).**

According to **Jeanne H. Steppal et al** regular physical exercise was recognized in ancient times as an important part of the treatment of diabetes mellitus.

Allen et al. demonstrated that exercise lowers the blood glucose concentration and transiently improves glucose tolerance in people with DM. Furthermore, there is now strong evidence that regular physical exercise protect against the development of type 2 DM in high risk population.

Whereas exercise in normal people has little impact on blood glucose concentrations, moderate-intensity exercise in patient with type 2 DM is usually associated with decrease blood glucose toward normal. This reaction may be used by patients to help regulate blood glucose concentration on a day-to-day basis and may be a mechanism by which regular physical exercise results in improved long term diabetic control.

In addition, the acute effect of exercise is lowering blood glucose level, it has been recognized for many years that physical training is associated with lower fasting and postprandial blood sugar concentrations and increased insulin sensitivity.

Brisk walking exercise plays a major role in the prevention and control of insulin resistance, pre-diabetes, GDM, type 2 diabetes, and diabetes-related health complications. Both aerobic and resistance training improve insulin action, and can assist with the management of Blood glucose levels, lipids, Blood pressure, Cardio-vascular risk, mortality, and Quality of life.

1.1 NEED FOR THE STUDY

"There is a natural healing force within us
and
It is the greatest force in getting well"
~ Hippocrates

"Movement is a medicine for creating change in
a person's physical, emotional, and mental states."
~ Carol Welch

Diabetes has emerged as the major public health problem across the globe. The problem is compounded further, since diabetes starts at much younger age and remains undetected in a large proportion. This would impose an enormous economic burden. We have to adopt preventive strategies on a war footing. Research in different populations has shown that emergence of diabetes in high risk populations can be prevented by regular physical exercise and dietary modification. This knowledge can be implemented in our day to day life on a universal basis. Type-2 Diabetes mellitus formerly known as Adult onset or Non-insulin dependent diabetes is the most common form of diabetes. It usually occurs in people over 35 years of age, and 80 to 90% of patients are overweight at the time of diagnosis. It is the chronic multi systemic disease related to abnormal production or impaired utilization of insulin.

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin, or alternatively, when the body cannot effectively use the insulin it produces. Hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels .The percentage of diabetic patients all over the world is increasing day by day. Diabetes is the third widespread and serious disease after heart disease and cancer. There have been several studies and calls for

attention to be paid to the increasing prevalence of diabetes worldwide; some statistics from The World Health Organization (WHO) follow:

- WHO estimates that more than 180 million people worldwide have diabetes. The estimations are likely to more than double by 2030.
- In 2005, an estimated 1.1 million people died from diabetes.
- Almost 80% of diabetes deaths occur in low- and middle-income countries.
- Almost half of diabetes deaths occur in people under the age of 70 years; 55% of diabetes deaths are in women.
- WHO projects that deaths due to diabetes will increase by more than 50% in the next 10 years without urgent intervention. Most notably, diabetes deaths are projected to increase by over 80% in upper–middle-income countries between 2006 and 2015.

Till date there is no cure for diabetes. Consequently the overall goal of care for patients with diabetes is control or regulation of blood sugar rather than cure. When diabetes is successfully regulated the client avoids the complications of hyper and hypoglycemia with minimal disruption to a normal life style. Diabetes control depends on the proper interaction of three factors food, Medication and exercise. Patients with Insulin dependent diabetes mellitus may require Insulin agents for lowering blood glucose levels.

The **IDF Diabetes Atlas update** (2012) reported that more than 371 million people have diabetes. The number of people with diabetes is increasing in every country. Half of people with diabetes are undiagnosed.4.8 million People died due to diabetes. More than 471 billion US- Dollar were spent on healthcare for diabetes.

India is at the top of the diabetes projections list – with a massive 79.4 million people affected by 2030, with a current national diabetes prevalence of 4.3% and costs already reaching US$2.2 billion, diabetes poses a major threat to India's emerging economy.12 Studies conducted in India in the last decade have highlighted that not only is the prevalence of type 2 diabetes high, but also that it is increasing rapidly in the urban population. An urban–rural difference in the prevalence rate was found, indicating that the environmental factors related to urbanization had a significant role in increasing the prevalence of diabetes. India needs to implement preventive measures to reduce the burden of diabetes as it poses a medical challenge that is not matched by the budget allocations for diabetes care in India. It is estimated that the annual cost of diabetes care would be approximately 90, 200 million rupees.

A study conducted by the Madras Diabetes Research Foundation which was supported by the Indian Council of Medical Research suggests that 1 out of every 10 people in Tamil Nadu is diabetic. While every 2 persons out of 25 are in a pre-diabetic stage. This means that about 42 lakhs individuals have diabetes and 30 lakhs people are in pre-diabetes stage.

In Madurai, on the occasion of World Diabetes Day (November 14), a team of 10 eminent doctors who have been treating diabetes patients for various complications including cardiology, nephrology and ophthalmology have cautioned about the rising burden of diabetes among people of all age groups in even smaller cities and towns. As the number of new patients detected with diabetes is on the rise, the doctors said that prevention and right treatment have to be done on a war-footing since 'sugar' can affect every vital part in the body starting from head to foot.

The statistics from Government Rajaji Hospital too looks threatening. In everyday nearly 300 – 350 patients gathered every morning to collect insulin doses. Besides, 350 – 400 patients already have diabetes and visit the hospital to get the oral hypoglycemic tablets. And nearly 50 - 60 patients are coming to monitor blood sugar level. Per day 50 new diabetes patients are reported at the Government Rajaji hospital. The patients do not have awareness regarding the benefits of incorporating complimentary therapies in the reduction of morbidity and mortality of diabetes.

Indians are not sufficiently aware about diabetes and its consequences. Diabetes can affect many parts of the body and can lead to serious complications. There is a need of one-to-one discussions with patients to inform, educate, and motivate them and hopefully help them change their lifestyle and diet. Working together, people with diabetes and their health care providers can reduce the occurrence of diabetes complication by controlling the levels of blood glucose, blood pressure and blood lipids and by receiving other complementary therapies like regular exercise, such as brisk walking exercise.

Type 2 diabetes is one that is growing at a rapid rate. It is projected that the worldwide incidence of type 2 diabetes will rise from 171 million people to 366 million by the year 2030 (Colberg, 2008). Type 2 diabetes is a subtype of diabetes and accounts for 90-95% of all cases of diabetes (Colberg, 2008). The primary goal of diabetes management is to control blood glucose within normal levels. There are risk factors that increase blood glucose levels such as age, obesity, body fat distribution, dietary factors, genetic factors, cardio-respiratory fitness, and physical inactivity that need to be addressed in order to improve and prevent type-2 diabetes (Colberg, 2008).

Regular exercise, along with diet and medication, has been identified as one of the three components of effective diabetes therapy. Regular exercise can help reduce potential side effects of type 2 diabetes mellitus including kidney disease, lower limb amputations, heart disease, nerve damage, blindness, and even death (Colberg, 2008). Exercise is a cornerstone of diabetes treatment because it helps reduce the risk of developing insulin resistance and glucose intolerance (Colberg&Grieco, 2009). Unfortunately, only 39% of individuals with diabetes engage in regular leisure time physical activity (Allen, Jacelon, & Chipkin, 2009).

Type 2 diabetics experience a decrease in their blood glucose levels for 2-48 hours following exercise (Colberg & Grieco, 2009). One bout of exercise can increase skeletal muscle glucose uptake, which bypasses the typical defects in insulin action that is associated with type 2 diabetes. This action is short lived and disappears around 48 hours post exercise. Chronic exercise helps improve the responsiveness of skeletal muscle to insulin and basal blood glucose uptake (Colberg & Grieco, 2009). It can be challenging for individuals to meet the recommended amount of physical activity when they live a busy life. In 1995, the American College of Sports Medicine (ACSM) and the CDC released a joint statement that 30 minutes or more of moderate intensity activity accumulated throughout the day, most days of the week, leads to significant health benefits (Quinn, Klooster, and Kenefick, 2006). This means that 30 minutes of physical activity can be divided up throughout the day and still be beneficial (Quinn, Klooster, &Kenefick, 2006). This is ideal for individuals with busy schedules who have a hard time fitting exercise into their everyday living.

Shapiro D, et.al, (2007) reported that interest in and use of complementary and alternative medicine has recently expanded in many countries around the world.

Population-based studies in countries in the developed world, such as Australia, Scotland, UK, Taiwan, Singapore and the United States of America (USA), report that one-half to two-thirds of adults use complementary therapies. Conventional medicine for individuals with diabetes has been geared toward regulating blood glucose with a combination of dietary modification, insulin and/or oral agents, maintaining ideal body weight, exercising regularly and self-monitoring blood sugar. Good glucose control can, however, be difficult for many people with diabetes, because these conventional treatment plans require changes to behavior and lifestyle. People with diabetes often work proactively to manage their condition, optimize their health and alleviate complications through the regular exercise.

Thomas et al. [2009] showed that there was a significant improvement in glycemic control with a reduction in visceral adipose tissue and that body fat was replaced by muscle with exercise. This improvement was, reduce of 0.6%HbA1c, achieved over a short period of time. Beginning with eight week duration, followed by six months, and finally 12 months. This recommendation was for type 2 diabetic patients to perform moderate-intensity aerobic exercise (Brisk walking, Jagging, cycling) routinely for 30 minutes per day.

The impact 0f an organized and supervised walking program for type 2 diabetes was evaluated by negri et al, [2010]. In their study, fifty nine diabetic patients were randomly assigned to control group and experimental group. Control group receiving standard lifestyle recommendations and an intervention group assigned to three supervised walking session per week, it produce significant fall in the fasting blood sugar and postprandial blood sugar.

Aerobic exercise like walking exercise is a highly effective part of diabetes treatment because it increases insulin sensitivity and lowers blood sugar. Many studies have reported the beneficial effect of walking exercise on diabetes confirming that the practice can stimulate the insulin producing cell in the pancreases. Brisk walking exercise has also been proven helpful for weight management, maintenance of blood pressure, blood sugar control, as well as lowering of the dosage of medications**. (American sports medicine)**

Diabetic patients must become knowledgeable about nutrition, medication effects and side effects, exercise, disease progression, prevention strategies, blood glucose monitoring techniques etc. Many hospitals employ nurses who specialize in diabetes education and management and they play a vital role in identifying diabetic patients, assessing self-care skills, providing basic education, reinforcing the teaching provided by the specialist, and referring patients for follow-up care after discharge(Suzanne c. smeltzer, 2009).

Since diabetes is a chronic disease and India is at the top of the diabetes projections list – with a massive 79.4 million people affected by 2030, and also diabetes poses a major threat to India's emerging economy. Studies conducted in India in the last decade have highlighted that not only is the prevalence of type 2 diabetes high, but also that it is increasing rapidly in the urban population.

Many clinical studies have suggested that practicing regular exercise, is controlling the blood glucose level, blood lipids, salivary cortisol, oxidative stress, fatigue, pain, and sleep both in healthy and ill populations. As the student researcher realized and interested that there is a great need of regular exercise for diabetic patients. Therefore the researcher motivated to practice brisk walking exercise as a

component in the management of Type-2 diabetes mellitus and to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type-2 diabetic Mellitus who are attending in Diabetic out- patient department, Government Rajaji Hospital, Madurai.

1.2 STATEMENT OF THE PROBLEM

A study to evaluate the effectiveness of Brisk walking exercise on glycemic level among patients with type-2 diabetes mellitus in Diabetic outpatient Department at Government Rajaji Hospital Madurai.

1.3 OBJECTIVES

- To assess the glycemic level among patients with type 2 diabetes mellitus in Diabetic outpatient Department at Government Rajaji Hospital, Madurai.
- To evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type 2 diabetes mellitus in the experimental group.
- To associate the glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variables.

1.4 HYPOTHESES

H_1 There is a significant difference in the glycemic level among the patients with type 2 diabetes mellitus before and after brisk walking exercise.

H_2 There is a significant association between the glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variables.

1.5 OPERATIONAL DEFINITION

Effectiveness

In this study it refers to the outcome of brisk walking exercise on glycemic level among the patients with type 2 diabetes mellitus. It was measured by bio-physiological measurement (Glucometer).

Brisk walking exercise

In this study, brisk walking exercise refers to, a type of aerobic physical exercise, walking at a pace of 12 minutes per kilometer. It will be practiced by the subjects for 30mins/day for 4 weeks. (2.5 kilometer per day).

Glycemic level:

In this study it refers to the amount of fasting blood glucose present in the circulating blood. It will be measured by using Glucometer.

Glucometer is an electronic medical device, used to determine the amount of glucose present in the circulating blood.

Diabetes mellitus

Diabetic mellitus is a chronic multi systemic disease related to abnormal production or impaired utilization of insulin.

Patients with type-2 Diabetes mellitus

In this study, it refers to patients who were attending the Diabetic outpatient department, diagnosed with type-2 diabetes and taking oral hypoglycemic drugs.

1.6 ASSUMPTION

- Type-2 Diabetic mellitus patients were cooperate and do the brisk walking exercise.
- Brisk walking exercise is a harmless management for Type-2 Diabetic mellitus patients.
- Brisk walking exercise is easily understandable and practicable.

1.7 DELIMITATION

- Subjects with type 2 diabetes mellitus on oral hypoglycemic agent who are attending outpatient department in Government Rajaji Hospital at Madurai during the data collection period.
- Brisk walking exercise was practiced by the subjects for 30mins / day only.
- The data collection period was limited to a period of 4 -6 weeks.

1.8 PROJECTED OUTCOME

The study will reveal the importance of brisk walking exercise in reducing the glycemic level among type 2 diabetes mellitus.

Review of Literature

CHAPTER - II

REVIEW OF LITERATURE

This chapter reports literature related to, the effects that exercise has on type 2 diabetes mellitus. Review of literature is one of the most important steps in the research process. It is an account of what is already known about a particular phenomenon. The main purpose of the literature review is, to convey to the readers about the work already done and knowledge and ideas that have been already established on a particular topic of research.

A literature review uses as its database reports of primary or original scholarship and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases, reports are written documents. The types of scholarship may be empirical, theoretical, critical/ analytic, or methodological in nature. Second, a literature review seeks to describe, summarize, evaluate, clarify and or integrate the content of primary reports.

The purpose of review of literature is to discover what is already known and what others have attempted to find out. Therefore, in this study, an intensive review of literature has been done from published and unpublished thesis and journals, text books, articles and electronic sources. The useful and relevant literature for the present study have been organized and presented under the following headings.

1. Reviews related to various contributory factors for diabetes mellitus.
2. Reviews related to various therapies on glycemic control for Type-2 diabetic mellitus.
3. Reviews related to the effect of brisk walking on Type-2 diabetes mellitus.

2.1 REVIEWS RELATED TO VARIOUS CONTRIBUTORY FACTORS FOR DIABETES MELLITUS

Patel et al., (2011) were conducted an observational study in Gujarat, India, to describe the risk factors of subjects with type-2 diabetes mellitus. This study was conducted among 622 newly-diagnosed type 2 diabetic subjects. 62% (384) of the subjects were male. The majority (68%) of the Type-2 Diabetes Mellitus subjects was obese, and 67% had a positive family history of diabetes. Renal dysfunctions and vision impairment were, respectively, found in 10%) and 9% subjects. The results revealed that many factors, such as obesity, family history of diabetes, dys-lipidemia, uncontrolled glycemic status, sedentary lifestyles, and hypertension were prevalent among the Type-2 Diabetes Mellitus subjects. This study concludes that the characterization of these risk factors will contribute to designing more effective and specific strategies for screening and controlling Type-2 DM.

Herpertzet,al (2011), conducted a multi-year study in UK, on Lifestyle modifications that may affect the development of diabetes and prevent complications was done. The ultimate goal is to determine whether long term lifestyle intervention can improve glycemic control and prevent complications in patients with type 2 diabetes. This initial report on this multi-year study describes protocols and the analysis of baseline data and three year in term results. The study enrolled 2205 patients with previously diagnosed type 2diabetes. The lifestyle modification programme included intensive lifestyle management at each outpatient clinic. The intervention group received educational materials concerning the importance of lifestyle and behavioral changes. Small, but significant differences in HbAlc levels between the intervention on (INT) and conventional (Con) therapy groups appeared as early as two years after the start of intervention and were maintained in the third year.

The effect of lifestyle modification on improving the glycemic control of patients with established type 2 diabetes mellitus was significant in these three years after initiation of the intervention.

Joni RicksetaI (2011) Clinical trials have demonstrated in London, regarding that, lifestyle changes can prevent type2 diabetes, but the importance of leisure-time physical activity (LTPA) is still unclear. They carried out post-analyses on the role of LTPA in preventing type-2 diabetes in 487 men and women with impaired glucose tolerance that had completed 12-month LTPA questionnaires. The subjects were participants in the Finnish Diabetes Prevention Study, a randomized controlled trial of lifestyle changes including diet, weight loss, and LTPA. There were 107 new cases of diabetes during the 4.1-year follow-up period. Individuals who increased moderate-to-vigorous LTPA or strenuous, structured LTPA the most were 63–65% less likely to develop diabetes. Adjustment for changes in diet and body weight during the study attenuated the association somewhat (upper versus lower third: moderate-to-vigorous LTPA, relative risk 0.51, 95% CI 0.26–0.97; strenuous, structured LTPA, 0.63, 0.35–1.13). Low-intensity and lifestyle LTPA and walking also conferred benefits, consistent with the finding that the change in total LTPA (upper versus lower third: 0.34, 0.19–0.62) was the most strongly associated with incident diabetes. Thus increasing physical activity may substantially reduce the incidence of type 2 diabetes in high-risk individuals.

Boffetta, B. et.al., **(2011)** investigated a pooled cross-sectional analysis in different parts of Asia, to evaluate the association between baseline body mass index (BMI, measured as weight in kg divided by the square of height in m) and self-reported diabetes status in over 900,000 individuals recruited in 18 cohorts. The

sample has been obtained from Bangladesh, China, India, Japan, Korea, Singapore and Taiwan. The sex- and age-adjusted prevalence of diabetes was 4.3% in the overall population, ranging from 0.5% to 8.2% across participating cohorts. The results revealed that positive association between BMI and diabetes prevalence was present in all cohorts and in all subgroups of the study population at (p-value of interaction<0.001), in cohorts from India and Bangladesh (p<0.001), in individuals with low education (p-value 0.02), and in smokers (p-value 0.03). This study concludes the strength of the association between BMI and prevalence of diabetes in Asian populations and identified patterns of the association by age, country, and other risk factors for diabetes.

Saja, F.Ghannam. et.al., (2010) performed a retrospective study in Medical laboratory sciences, Rafedia & al watani, Hospital, Nablus, to study the relationship between diabetic mellitus and age among 83 samples. The blood sugar level was obtained from each sample and the findings were the majority of diabetic cases increases in the age above 40 years.

Sheri R. Colberget Al., (2009) A descriptive study was conducted at USA, among 100 type 2 diabetes patients regarding, to assess the knowledge and attitude on self- care activities by using interview schedule and Likert's scale. The results showed that 48% of the patients had inadequate knowledge, 35% of the patients had moderately adequate knowledge and 17% of the patients had adequate knowledge. Regarding attitude 72% of the patients had undesirable attitude, 16% of the patients had desirable attitude and 12% of the patients had most desirable attitude on self-care activities. The researcher concluded that most of the patients were having inadequate

knowledge and attitude about diabetes mellitus. So it is suggested that proper health education can improve the patient's knowledge and attitude on self- care activities.

Maraldi et al., (2007) conducted a study in USA, The goal of the study is to investigate the prospective relationship between diabetes mellitus and depressive symptoms among the 70 to 79 years old persons among 2,522 community – dwelling subjects, without baseline depressive symptoms. Depression scale was used in that study. The results showed that participants with DM had increased incidence of depressed mood (23.5% vs 19%) (P = .02) and recurrent depressed mood (8.8% vs 4.3%) (P<.001) than those without DM. A stronger relationship was observed between DM and recurrent depressed mood particularly among with poor glycemic control. The researcher concluded that among well-functioning older adults, DM is associated with risk of depressive symptoms.

Stevenson, CR. et.al., (2007) conducted an experimental model study in India. The purpose of the study is, to assess the potential impact of diabetes as a risk factor for incident pulmonary tuberculosis. The tuberculosis incidence and diabetes prevalence was assessed between urban and rural area. Results revealed that diabetes accounts for 14.8% of pulmonary tuberculosis and 20.2% of smear-positive (i.e. infectious) tuberculosis. It is estimated that the increased diabetes prevalence in urban areas is associated with a 15.2% greater smear-positive tuberculosis incidence in urban than rural areas - over a fifth of the estimated total difference. This study concludes that Diabetes makes a substantial contribution to the burden of incident tuberculosis in India, and the association is particularly strong for the infectious form of tuberculosis.

Adamu, G. Bakari. et al., (2006) conducted a cross-sectional study in Nigeria. The goal of the study is, to assess the relationship between random blood sugar and body mass index in an African population among 317 subjects. The mean age of subjects was 35.0 + 9.8 years (33.0 + 9.6 among females and 36.2 + 9.6 among males p= 0.1007). The result of the study was female subjects had significantly higher BMI than their male counterparts at (p=0.0341). The random blood sugar levels were, however, similar between males and females (85.2 + 27.0 mg/dl versus 85.9 + 14.7 mg/dl, p=0.8868). There was a positive but non-significant correlation between casual blood sugar and BMI among female subjects (r= +0.1520, p>0.05). In the males however, there was no correlation between these variables (r= -0.0395, p>0.5). The conclusion of the study was BMI is higher among females and correlates with random blood sugar levels.

Danish- British multi-center survey (2006) conducted a cross sectional study in British, to assess the patient's compliance regarding continuous blood glucose monitoring. The study was conducted among 1076 patients with diabetes mellitus. The variables were test frequency and motive. Glucose monitoring was performed daily by 39% of the patients and less than weekly by 24% and 67% reported to perform routine testing while the remaining 33 % only tested when hypo or hyperglycemia was suspected. Age, gender and level of diabetes related concern were associated with test pattern. Reported frequencies of mild and severe hypoglycemia and awareness of hypoglycemia were independently associated with testing behavior. Conclusion of the study was patient's compliance regarding continuous blood glucose monitoring is thus limited. Almost two thirds of the patients do not perform daily blood glucose monitoring and one third does not perform routine tests.

2.2 REVIEWS RELATED TO VARIOUS THERAPIES ON GLYCEMIC CONTROL FOR TYPE-2 DIABETIC MELLITUS.

Aljasir.B, et.al., (2010) a study was conducted in Ontario, Canada to analyze the effect of practicing yoga for the management of type-2 Diabetes among 363 patients. The results showed improvement in outcomes among patients with type-2 diabetes. These improvements were mainly among short term or immediate diabetes outcomes and not all were statistically significant. No adverse effects were reported in any of the included studies. Short-term benefits for patients with diabetes may be achieved from practicing yoga. Further research is needed in this area. Factors like quality of the trials and other methodological issues should be improved by large randomized control trials with allocation concealment to assess the effectiveness of yoga on diabetes type-2.

Richard R. Rubi, et al., (2010) a study was conducted in Delhi. In this study, investigated the effects of an 8 weeks programme of supervised exercise on glycemic control and cardio respiratory fitness in adolescents with NIDDM. The experimental group participated in supervised exercise programme in the hospital exercise area for 30-45 minutes for 3 days a week, for 8 weeks. The control group received instructions regarding the importance of regular exercise including frequency, duration and recommended activities. But glucose and cholesterol were not supervised, and weight was checked before and after the exercise programme. There was a significant improvement in the experimental group though no statistical significant changes were seen in the control group. It implies that regular, supervised exercise programme helps to maintain the glycemic control.

Centre and the local community(2010) a study was conducted at Hyderabad; The purpose of the study is, to evaluate the use of a low fat, vegetarian diet in patients with type 2 was associated with significant reductions in fasting serum glucose concentration and body weight in the absence of recommendations for exercise. Subjects are randomly assigned a low fat vegetarian diet or a conventional low fat diet (four subjects). Although the sample was intentionally small in accordance with pilot study design, the 28 per cent mean reduction in fasting serum glucose of the experimental group, from 10.7 to 7.75 mmol/L (195 to 141 mg/dl), was significantly greater than the 12 per cent decrease, from 9.86 to 8.64 mmol/L (179 to 157mg/dl), for the control group ($P<0.05$). The mean weight loss was 7.2 kg in the experimental group, compared to 3.8 kg for the control group ($P<0.005$). Differences between the diet groups in the reductions of serum cholesterol and 24 h micro albuminuria did not reach statistical significance. However, high density lipoprotein concentration fell more sharply (0.20 mmol/L) in the experimental group than in the control group (0.02 mmol/L) ($P<0.05$). Study concluded stating that the use of a low fat, vegetarian diet in patients with type 2 was associated with significant reductions in fasting serum glucose concentration and body weight in the absence of recommendations for exercise.

Mark Williams et.al.(2009) a study was conducted in Germen. The purpose of the study is, to determine the effectiveness of patient education and exercise and diet interventions on blood glucose control for patients with type2 diabetes. Of a total of 100 participants, 33 were instructed to follow the standard diet for the type2 DM patients, 28 were preformed exercise in addition to the slandered diet and 39 did not participate in either exercise or follow the diabetic diet . The result shows, 8 weeks intervention programme indicate, that diabetic education and intervention program

involving the combination of exercise and diet enhanced the effectiveness in blood glucose control in patient with type 2 DM.

Savita Singh.et.al.,(2008) conducted an experimental study in Delhi, to see the influence of yoga-asanas and pranayamas in modifying certain biochemical parameters among 60 uncomplicated type-2 diabetes patients between the age group of 35-60 years of 1-10 years of duration. They were divided into two groups: Group 1 (n=30): performed yoga along with the conventional hypoglycemic medicines and group 2 (n=30): patients who only received conventional medicines with the duration of 45 days. The results showed a significant improvement in all the biochemical parameters (fasting and Post- prandial blood sugar and lipid profile) in group 1 while group 2 showed significant improvement in only few parameters, thus suggesting a beneficial effect of yoga regimen on these parameters in diabetic patients.

Central Register of Controlled Trials (2008) conducted a study in USA; to assess the effect of exercise in type 2 diabetes mellitus was researched. Trials were identified through the fourteen randomized controlled trials comparing exercise, against no exercise in type 2 diabetes were identified involving 377 participants. Trials ranged from eight weeks to twelve months duration compared with the control. The exercise intervention significantly improved glycemic control as indicated by a decrease in glycosylated hemoglobin levels of 0.6 percent. This resulted in both statistically and clinically significant changes. There was no significant difference between groups in whole body mass, probably due to an increase in fat free mass, with exercise intervention significantly increased insulin response and decreased plasma triglycerides. No significant difference was found between groups in quality

of life. The analysis shows that exercise significantly improves glycemic control and reduces visceral adipose tissue and plasma triglycerides

Rothaman, RL.et.al., (2008) conducted a study in USA, two years survey method study to assess the self-management behaviors, racial disparities, and glycemic control among adolescents with type-2 diabetes in Vanderbilt center for health services research, among 139 subjects were contacted through telephone, 103 (74%) completed the study. 69% were girls, 47% were white, and 46% were black. The mean glycosylated hemoglobin was 7.7% and the average duration of diabetes was 2 years. In that more than 80% of patients reported > or = 75% medication compliance, and 59% monitored blood glucose > 2 times daily. More than 70% of patients reported exercising > or = 2 times a week, but 68% reported watching > or = 2 hours of television daily. Nonwhite patients were more likely to watch > or = 2 hours of television per day (78% vs 56%), to report exercising < or = 1 time per week (35% vs 21%), and to drink > or = 1 sugary drink daily (27% vs 13%). The conclusion of that study shows that the patients reported good medication and monitoring adherence, they also reported poor diet and exercise habits and multiple barriers. Non-white race was significantly associated with poorer glycemic control even after adjusting for co-varieties. Additional studies are indicated to further assess self-management behaviors and potential racial disparities in adolescents with type 2 diabetes.

McPherson, ML. Smith, SW. Powers, A. & Zuckerman, IH. (2007) a cross-sectional study was conducted in Africa, to assess the association between diabetes patients' knowledge about medications and their blood glucose control. Maryland in African American population among 44 patients with patient's on oral

pharmacologic treatment for type-2 diabetes. They asked to answer a short questionnaire with 8 components and a medication knowledge score was tabulated and correlated to the most recent glycosylated hemoglobin (A1c). The mean score was 5. Older patients and male patients scored lower than their counterparts. There was a strong inverse association between knowledge score and A1c (r=-0.61; P<.001). Glycosylated hemoglobin was one-half unit lower with each one-unit increase in knowledge score among men; among women A1c was 1.6 units lower for each one-unit increase in knowledge score. The investigator concluded that the patients with greater understanding and knowledge of their medications demonstrated better glycemic control.

Shivanandhanayak et.al ., (2005) conducted a study in India, to evaluate the influence of aerobic treadmill exercise on blood glucose homeostasis among 45 and 60 years of 10 males in experimental group and 10 males in the control group of noninsulin dependent diabetes mellitus patients for the period of 6 weeks. The results showed that there was a significant decrease in postprandial blood sugar (44.4mg% for the study group and 32.2 mg% for the control group with a significant inter-group difference was observed. The mean decrease in fasting blood sugar (39.4mg% for the study group and 27.4mg% for the control group), with a marginal inter group difference (P<0.05) was observed. The conclusion of the study was treadmill exercise was found to be a definite tool in addition to drug and diet in glycemic control.

Malkotra.et.al., (2005) conducted a study in New Delhi, India to evaluate the effect of different yoga asanas on 20 mild to moderate type-2 diabetic patients, in the age group of 30-60 years were selected from the out-patient clinic of G.T.B. hospital for 40 days yoga. 13 specific (Surya Namaskar, Trikonasana, Tadasana, Sukhasana,

Padmasana, Bhastrika Pranayama, Pashimottanasana, Ardhmatsyendrasana, Pawanmuktasana, Bhujangasana, Vajrasana, Dhanurasana and Shavasana) Yoga asanas< or = done by Type 2 Diabetes patients were included. The results indicate that there was significant decrease in fasting glucose levels from basal 208.3 +/- 20.0 to 171.7 +/- 19.5 mg/dl and one hour postprandial blood glucose levels decreased from 295.3 +/- 22.0 to 269.7 +/- 19.9 mg/dl. A significant decrease in waist-hip ratio and changes in insulin levels were also observed, suggesting a positive effect of yoga asana on glucose utilization and fat redistribution in NIDDM. Yoga asana may be used as an adjunct with diet and drugs in the management of Type 2 diabetes.

Patrick Phipps et.al., (2003) conducted a study in Russia, a multicenter, randomized, double-blind, placebo-controlled, parallel group design, to evaluate the acarbose improvement in glycemic control in over weight type 2 diabetic patients among 81 patients for HBA1c and 82 for fasting blood glucose for 24 weeks. Change in fasting blood glucose was assessed as a secondary efficacy parameter. The results showed that there is a statistically significant differences between acarbose and placebo treatment in HbA1c (1.02%; 95% CI 0.543–1.497; *P* _ 0.0001) and fasting blood glucose (1.132 mmol/l; 95% CI 0.056 –2.208; *P*_0.0395). In all, 18 patients (47%) in the acarbose group were classified as responders with a 5% reduction in HbA1c at the end point compared to 6 (14%) in the placebo group (*P* = 0.001). The conclusion of the study was an addition of acarbose to metformin mono-therapy provides efficacious and safe alternative for glycemic improvement in overweight type-2 diabetes patients inadequately controlled by metformin alone.

2.3 REVIEWS RELATED TO THE EFFECT OF BRISK WALKING EXERCISE ON TYPE-2 DIABETES MELLITUS:

Van Dijk, JW. et.al., (2012) a study was conducted in Netherland, a randomized cross over experimental study, to evaluate the exercise therapy in type-2 diabetes to optimize the glycemic control by the department of human movement sciences, Maastricht university medical center, among 30 type 2 diabetic patients (age 60 ± 1 years, BMI 30.4 ± 0.7 kg/m (2), and HbA1c 7.2 ± 0.2%) participated in the study. Blood glucose homeostasis was assessed by three level with continuous glucose monitoring over 48 h during with subjects who performed no exercise (control) or 60 min of cycling exercise (50% maximal workload capacity) distributed either as a single session performed every other day or as 30 min of exercise performed daily. The result of that study showed the prevalence of hyperglycemia (blood glucose >10 mmol/L) was reduced from 7:40 ± 1:00 h:min per day (32 ± 4% of the time) to 5:46 ± 0:58 and 5:51 ± 0:47 h:min per day, representing 24 ± 4 and 24 ± 3% of the time, when exercise was performed either daily or every other day, respectively ($P < 0.001$ for both treatments). The investigator concluded that a short 30-min session of moderate-intensity endurance-type exercise substantially reduces the prevalence of hyperglycemia throughout the subsequent day in type 2 diabetic patients.

Thangapandiyan.et.al.,–2012 a randomly allocated study was conducted in Annamalai university, Tamilnadu, to evaluate the role of the brisk walking and yogic exercises on fasting blood glucose levels among adult males with type-2 diabetes mellitus. 20 study participants in group 1 underwent brisk walking intervention and 20 other study participants in group 2 underwent yoga intervention for 60 minutes daily between 6 AM to 7 AM for 15 consecutive days into a two interventional

groups. Significant reduction ($p<0.05$) in fasting blood glucose level of participants has been seen in both groups on the 15th day of intervention from its baseline value by using calibrated glucometer. The findings conclude that yogic exercises and brisk walking have enhanced the blood glucose lowering capacity among diabetic patients with pharmacological treatment and may be practiced as an adjuvant therapy for type 2 diabetic populations to reduce or prevent long-term complications.

Senthil Kumar et.al (2011) conducted a systematic independent literature search to describe the role of physical activity in prevention and treatment of type 2 DM and its complications among 25 reviews. The result of the study showed that, 14 studies were on prevention only; 7 were on treatment only; 2 were on both prevention and treatment; and 2 were guidelines/ consensus statements. From the prevention studies, physical activity reduced the risk of T2DM by 25-35%. From the treatment studies, physical activity not only reduced HbA1c levels but also enhanced social participation and quality of life. The study had been concluded that **r**egular physical activity such as simple walking for 30min per day for all/most days of the week was shown to prevent and manage T2DM effectively.

The Da Qing study in China (2011) a study was conducted in US, to evaluate the role of physical activity on Diabetes. The study included an exercise-only treatment arm and reported that even modest changes in exercise (20 min of mild or moderate, 10 min of strenuous, or 5 min of very strenuous exercise one to two times a day) reduced diabetes risk by 46% (compared with 42% for diet plus exercise and 31% for diet alone). Data show that moderate exercise such as brisk walking reduces risk of type-2 diabetes, and all studies support the current recommendation of 2.5

h/week of a moderate aerobic activity (Brisk walking exercise) or typically 30 min/day for 5 days/week for prevention.

American College of Sports Medicine (2010), a study was conducted in America, to investigate the effects of an 8 weeks programme of supervised walking exercise on glycemic control and cardio respiratory fitness in adolescents with NIDDM. The experimental group participated in supervised walking exercise programme in the hospital exercise area for 30 -45 minutes for 3 days a week, for 8 weeks. The control group received instructions regarding the importance of regular exercise including frequency, duration and recommended activities. But glucose and cholesterol were not supervised, and weight was checked before and after the exercise programme. There was a significant improvement in the experimental group though no statistical significant changes were seen in the control group. It implies that regular, supervised walking exercise programme helps to maintain the glycemic control.

Kavouras.et.al., (2007) conducted a correlation study in Greece, to evaluate the relationship between physical activity, obesity status, with glycemic control and insulin resistance among 1514 men and 1528 women without evidence of cardiovascular or other chronic disease. The participants were classified as inactive, minimally active or health enhancing physical activity (HEPA) based on the International Physical Activity Questionnaire. Insulin sensitivity was assessed by the homeostatic model (HOMA), and overweight or obesity was assessed according to BMI (BMI>OR= 25). The conclusion of the study was the physical activity such as brisk walking exercise had a significant effect on insulin sensitivity.

Snowling& Hopkins et. al.(2006). The study was conducted in US, to evaluate the structured aerobic exercises such as walking reduces the absolute hemoglobin A1c value by about 0.6% and improves insulin sensitivity. The study proves that aerobic training such as walking combined with resistance training improves glycemic control suggests that daily walking combined with diet therapy is useful for obese patients and can likewise work with type 2 diabetes. Although it is evident that physical activities such as walking helps control type 2 diabetes, 60-80% of the adult population in the US do not meet the recommended levels of physical activity. Much of this low engagement in physical activities such as walking is correlated to the fear of walking alone and the risk of danger while walking outside. Lack of interest in physical activity being part of lifestyle particularly in the US prevents people with type 2 diabetes to engage in walking or exercise. People who engage in physical activities including walking have a lower risk of chronic diseases including diabetes. Brisk walking was associated with low risk of type 2 diabetes compared with regular walking. Higher levels of walking are associated reduced mortality risk and help control glucose levels of people with type 2 diabetes.

Robert Wozniaket.al., (March 2006), the researchers searched through EMBASE and Medline, to examine the various studies and reference lists of retrieved articles, with the objective of systematically evaluating the evidence for an association between physical activity of moderate intensity and risk of type 2 diabetes. Outcomes and estimates of associations were extracted independently by two investigators who identified 10 prospective cohort studies of physical activity of moderate intensity and type 2diabetes, including a total of 301, 221 participants and 9,367 incident cases. Five of these studies specifically investigated the role of walking. The summary RR of type2diabetes was 0.69 for regular participation in

physical activity of moderate intensity as compared with being sedentary. Similarly, the RR was 0.70 for regular walking as compared with almost no walking. The associations remained significant after adjustment for BMI. Similar associations were observed in men and women in the US and Europe. These findings indicate that adherence to recommendations to participate in physical activities of moderate intensity such as brisk walking can substantially reduce the risk of type 2 diabetes. Although traditionally seen in middle aged and older people type-2diabetes which is associated with obesity, poor diet and lack of exercise, is increasingly being diagnosed in children and young people who are overweight. Studies from around the world point to the usefulness of diet and exercise regimens in preventing onset of this illness.

Mikines et al. (2005) conducted a meta-analysis study in UK, to evaluate the effect of exercise on glycemic level. Explained by his study, that exercise usually results in a decrease of blood glucose concentrations toward normal in hyperglycemic patients with type 2 DM, and because increased insulin-stimulated glucose disposal can be observed for many hours after a single bout of exercise, it is likely that regular exercise 4 to 7 days a week may result in lower average blood glucose and glycol-hemoglobin concentrations without a significant effect on fasting blood glucose or the glucose response to meals. In a meta-analysis of studies looking at the effects of walking exercise on glycemic control, the hemoglobin A_{1C} value was significantly lower in the exercise groups compared with that of the control groups (7.65% vs. 8.31%). Thus, the net effect of exercise repeated on a regular P.1102, basis would be to improve long-term blood glucose control in patients with type 2 DM.

Normand et al., (2001) conducted a Meta- analysis study in US, of controlled clinical trials to evaluate the effect of exercise on glycemic control and body mass in type-2 diabetes mellitus among 14 controlled trials with the duration exercise ≥ 8 weeks. Twelve aerobic exercise study and 2 resistance study were included in the study. The weighted mean post intervention groups Hb A1c was lower than in the exercise group compared with control groups (mean 7.65% vs 8.31%; weighted mean difference, -0.66%, P<0.001). The difference in post intervention in body mass between exercise group and control group was not significant (83.03 kg to 82.48 kg, weighted mean difference 0.54, P=0.76). The conclusion of the study was the exercise program had significantly reduced the HbA1c level among the type-2 diabetes patients.

2.4 CONCEPTUAL FRAMEWORK

The conceptual framework for research study presents the measure on which the purpose of the proposed study is based. The framework provides the perspective from which the investigator views the problem.

The study is based on the concept that administration of brisk walking exercise to patients with DM will control glycemic level. The investigator adopted the wiedenbach's helping art of clinical nursing theory (1964) as a base for developing the conceptual framework. Ernestin wiedenback proposes helping art of clinical nursing theory in 1964 for nursing, which describes a desired situation and way to attain it. Nursing is a helping service that is rendered with compassed skill and understanding to those in need of care, counsels and confidence is the area of health (1977). A desired situation directs action towards the explicit goal. The theory has 3 factors.

- Central purpose
- Prescription
- Realities

Central purpose: The central purpose defines that quality of health she desires to affect or sustain in her patients and specifies what she recognizes to be her special responsibility in caring for the patient.

In this study, it defines the accomplishment of the nurse goal to reduce the glycemic level.

Prescription: once the nurse identified her own philosophy and recognizes that the patient has autonomy and individuality, she can work with the individual to develop a prescription or plan of his care. It will specify the nature of action that will fulfill the

nurse's central purpose. A prescription may be voluntary or involuntary. A prescription is a directive to at least 3 kinds of voluntary actions.

- Mutually understood and agreed upon action (recipient and practitioner)
- Recipient-directed action and (ways in which to be carried out).
- Practitioner-directed actions (practitioner carried action).

In this study the prescription depicts the mutual relationship and rapport developed between the investigator and patients. The investigator teaches the techniques of brisk walking exercise and the patients understand, cooperate and learn the techniques.

Realities: It refers to the physical, physiological, emotional and spiritual factors that come into play in situation involving nursing action. The five realities identified by Wiedenbach's are agent, recipient, goal, means and framework.

1. Agent: According to the theorist, the agent who is the practicing nurse or her delegate is characterized by the personal attributes, capacities, and most importantly commitment and competencies in nursing.

In this study, **Agent** - Investigator

2. Recipient: According to the theorist the recipient, the patient is characterized by personal attributes, problems, capacities, aspirations and most important the ability to cope with the problems being experienced.

In this study, **Recipient** - Type-2 DM patients

3. Goal: According to the theorist, the goal is the desired outcome the nurse wishes to achieve. The goal is the end result to be attained by the nursing action.

In this study, **Goal** - **a**. To reduce glycemic level

b. To prevent from developing complications

4. Mean: According to the theorist, the mean comprise the activities and devices through which the practitioner is enabled to attain her goal.

In this study, **Means** - Brisk walking exercise

5. Framework: According to the theorist, it consists of human, environment, professional and organizational facilities that not only make up the context within which nursing is practiced but also constitutes its currently existing limits.

In this study, **Framework** - Diabetic outpatient department at GRH, Madurai.

The conceptualization of **nursing practice** according to this theory consists of three steps as follows.

Step 1: Identification of the patient's need for help

Step 2: Ministering the need for help

Step 3: Validating the need for help

Step 1

This step involves determining the need for help. The type-2 DM patients were identified based on demographic variables (age, sex, Religion, education, occupation, monthly income, marital status, duration of illness, drug, diet pattern, and body mass index). And the investigator explores the need and change in behavior in to reduce high glycemic level by means of pretest assessment.

Step 2

Ministration:

The nurse gives advice or information, applies a comfort measure or carryout the therapeutic procedure and makes the adjustment in the plan of action if needed.

In this study, the investigator gives suggestion about the complementary therapy regarding brisk walking exercise and explains its benefits after which the patient gives their acceptance to carry out the plan of action.

Brisk walking exercise was given to experimental group.

Step 3

After ministering the need the nurse validates whether the actions where indeed helpful. In this the validation of the care (Brisk walking exercise) provided was assessed by posttest level of glycemic level. By this the effective results was accomplished.

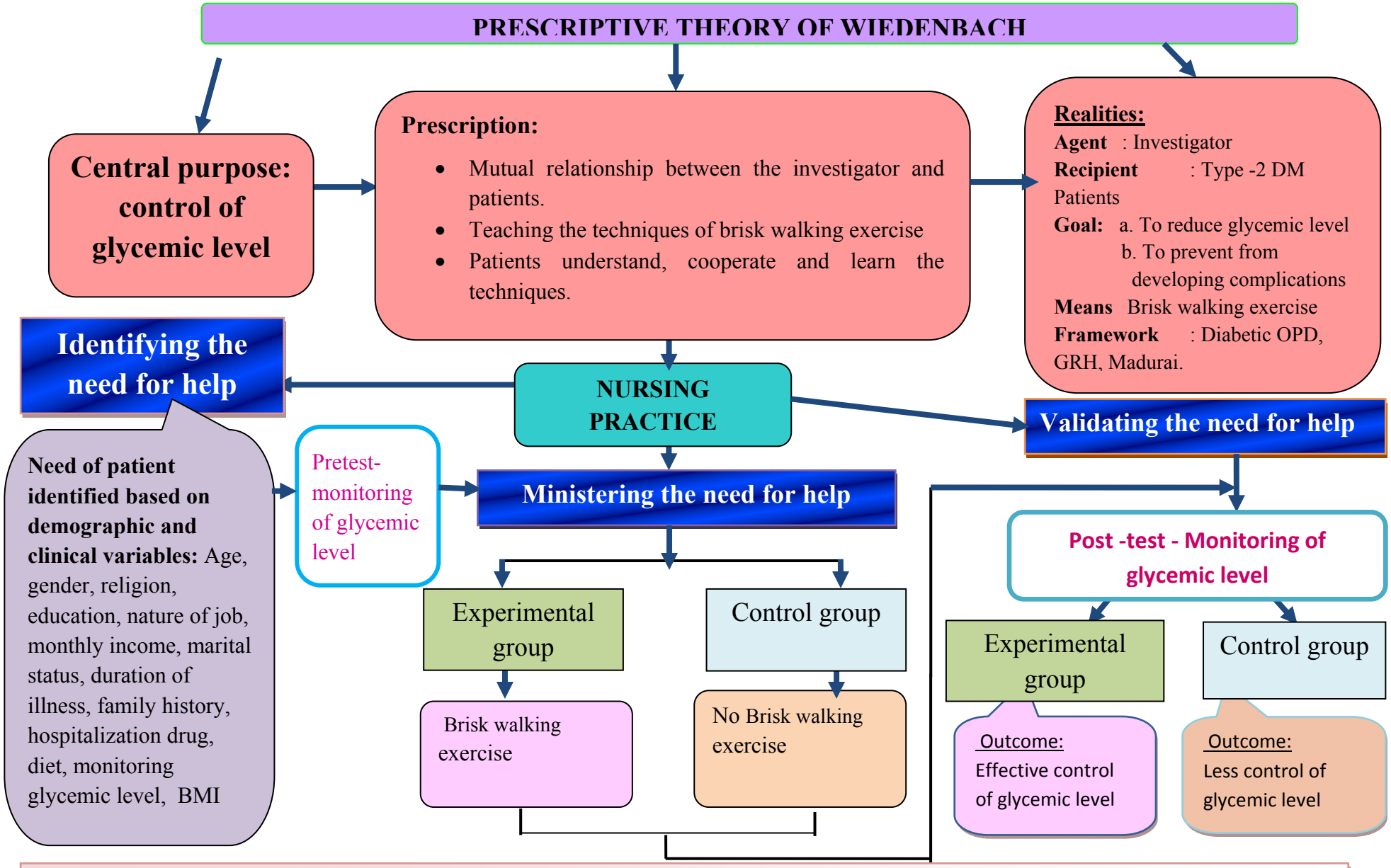


FIGURE 1- MODIFIED MODEL OF WIEDENBACH'S HELPING ART OF CLINICAL NURSING THEORY

39

Methodology

CHAPTER - III

RESEARCH METHODOLOGY

This chapter includes the research approach, research design, and setting of the study, sample and sampling technique. It further deals with development of tool, procedure for data collection and plan for data analysis.

3.1 RESEARCH APPROACH:

A Quantitative approach was adopted by the researcher to evaluate the effectiveness of brisk walking exercise.

3.2 RESEARCH DESIGN

The research design used for this study was true experimental - the pretest & post-test control group design.

R	EXPERIMENTAL GROUP	O_1	X	O_2
	CONTROL GROUP	O_1	-	O_2

O_1 – Glycemic level before manipulation

O_2 - Glycemic level after manipulation

X – Intervention (Brisk walking exercise)

3.3 RESEARCH VARIABLES

Independent variable	–	Brisk walking exercise
Dependent variable	-	Fasting Glycemic level among patients with Type-2 DM.
Demographic Variables	-	Age, sex, educational status, nature of job, Income, marital status,
Clinical variables	-	Duration of illness, family history, previous hospitalization, medication, diet, and body mass index.

3.4 SETTING OF THE STUDY:

The study was conducted at Diabetic OPD, Government Rajaji Hospital, Madurai-20. It is a 2518 bedded multi-specialty medical college hospital and it provides comprehensive care to all. The hospital has a separate Dialectology OPD. Approximately 300 – 350 patients were receiving insulin injection daily and 350-400 patients were receiving oral hypoglycemic agents. And 50-60 patients were coming for glycemic level investigation daily. Per day 50 new diabetes patients are reported. The Dialectologist team consists of Chief Dialectologist, assistant Dialectologist, nurse, pharmacist, lab investigator, and dietician. The department has the separate patient teaching room and counseling room for Diabetic patients.

3.5 POPULATION

Target population

The target population is patients with type-2 diabetes mellitus.

Accessible population:

The study population is patients with type-2 diabetes mellitus attending the Diabetic Out Patient Department at Government Rajaji Hospital, Madurai.

3.6 SAMPLE

Both male and female patients who are with type-2 diabetes mellitus, who met inclusion criteria, attending the Diabetic Out Patient Department at Government Rajaji Hospital, Madurai.

3.7 SAMPLE SIZE

The sample size was 60 among that, 30 samples in the experimental group and 30 samples in the control group.

3.8 SAMPLING TECHNIQUE

The researcher adopted probability simple random sampling technique, in this lottery method was used to select the subjects for the study.

3.9 CRITERIA FOR SAMPLE SELECTION

Inclusion criteria

- Subjects with type 2 diabetes mellitus in the age group of 30 – 50 years
- Subjects who are on oral hypoglycemic agent.
- Both Gender.
- Subjects speak and understand Tamil.
- Subjects who are willing to participate.

Exclusion criteria

- Subjects who are participate in the pilot study.
- Subjects with complications like (cardio vascular disease, foot ulcer, contractures and paralysis, peripheral vascular disease, retinopathy, nephropathy. arthritis).
- Subjects who are not present at the time of data collection.
- Subjects who are practicing exercise regularly.
- Subjects who are having fasting glycemic level > 250 mg/dl.

3.10 DESCRIPTION OF THE TOOL

The tool used in this study consists of two sections.

Part I

Semi-structured tool consists of Demographic and clinical variables. This tool contains 15 items.

Demographic variables such as age, gender, religion, educational status, nature of job, income, marital status and information related to disease condition such as duration of illness, family history of diabetes mellitus, previous hospitalization, medications, dietary pattern, monitoring of glycemic level and body mass index.

Part II

It consists of the assessment of patients glycemic level by Bio-physiological measurement by using Glucometer.

The second tool was used to measure the fasting glycemic level of type -2 diabetes mellitus patients. (Glucometer)

Monitoring of glycemic level	Date	Time	Finding (mg / dl)	
			Pretest	Post test
			Day 1	Day 28
Fasting glycemic level				

SCALE FOR FASTING GLYCEMIC LEVEL FOR TYPE -2 DIABETES MELLITUS PATIENTS

Fasting glycemic level.	80-120 (mg/dl)	121-160 (mg/dl)	161-200 (mg/dl)	201-250 (mg/dl)
Pretest				
Posttest				

TESTING OF THE TOOL

3.12 CONTENT VALIDITY

The tools used for this study was given to one Medical expert and four experts in the field of nursing for content validity. Suggestions were considered and appropriate changes were made and found to be valid.

3.13 RELIABILITY.

Pilot study reliability of the tool was assessed by using interrater method. Correlation coefficient values, r- 0.87.This correlation coefficient is very high and it is good tool for assessing the effectiveness of brisk walking exercise on glycemic among

clients with type-2 diabetes mellitus. The reliability certificate was obtained from Quality concepts laboratory at Madurai, for the glucometer

3.14 PILOT STUDY

The pilot study was conducted at diabetic Out Patient Department, Government Rajaji Hospital to test the feasibility of setting, samples, relevance and practicability of the intervention among 10 subjects in diabetic Out Patient Department. The pilot study period was one week (from 1.8.14 to 7.8.2014). Among 10 subjects; 5 were in the experimental and remaining 5 subjects in the control group. The results revealed that there was significant difference in pre-test and post-test level of glycemic level among type-2 diabetic patients. Pilot study revealed that the study was feasible.

3.15 DATA COLLECTION PROCEDURE

The investigator obtained formal permission to conduct the study from respective authorities and Ethical committee of Madurai Medical College, Madurai. The study period was from 12.08.2014 to 15.09.14. The researcher was introduced herself to the selected subjects. The data has been collected from the subjects who were interested to participate in the study who met the inclusion criteria and 20 samples were selected each day. Simple random sampling method was used to collect the samples. Informed written consent was obtained from each subject after giving assurance of confidentiality. The subjects were interviewed by semi-structured questionnaire, in order to collect demographic data. The investigator assessed the fasting glycemic level by using glucometer for the subjects. Random assignment of sample done by using lottery method. Odd numbers are considered as experimental group and even numbers are considered as control group.

Brisk walking exercise was demonstrated by the investigator to the study participants, then all the participants was practiced brisk walking exercise, 30 mins per day for four weeks. (The experimental groups were divided into 3 groups. For each group, the brisk walking exercise was practiced by the researcher from 6.00 am to 7.30am on every day morning). Participants in the control group received standard treatment. At the end of the fourth week, fasting glycemic level was monitored for both the groups by using the glucometer.

3.16 PLAN FOR DATA ANALYSIS

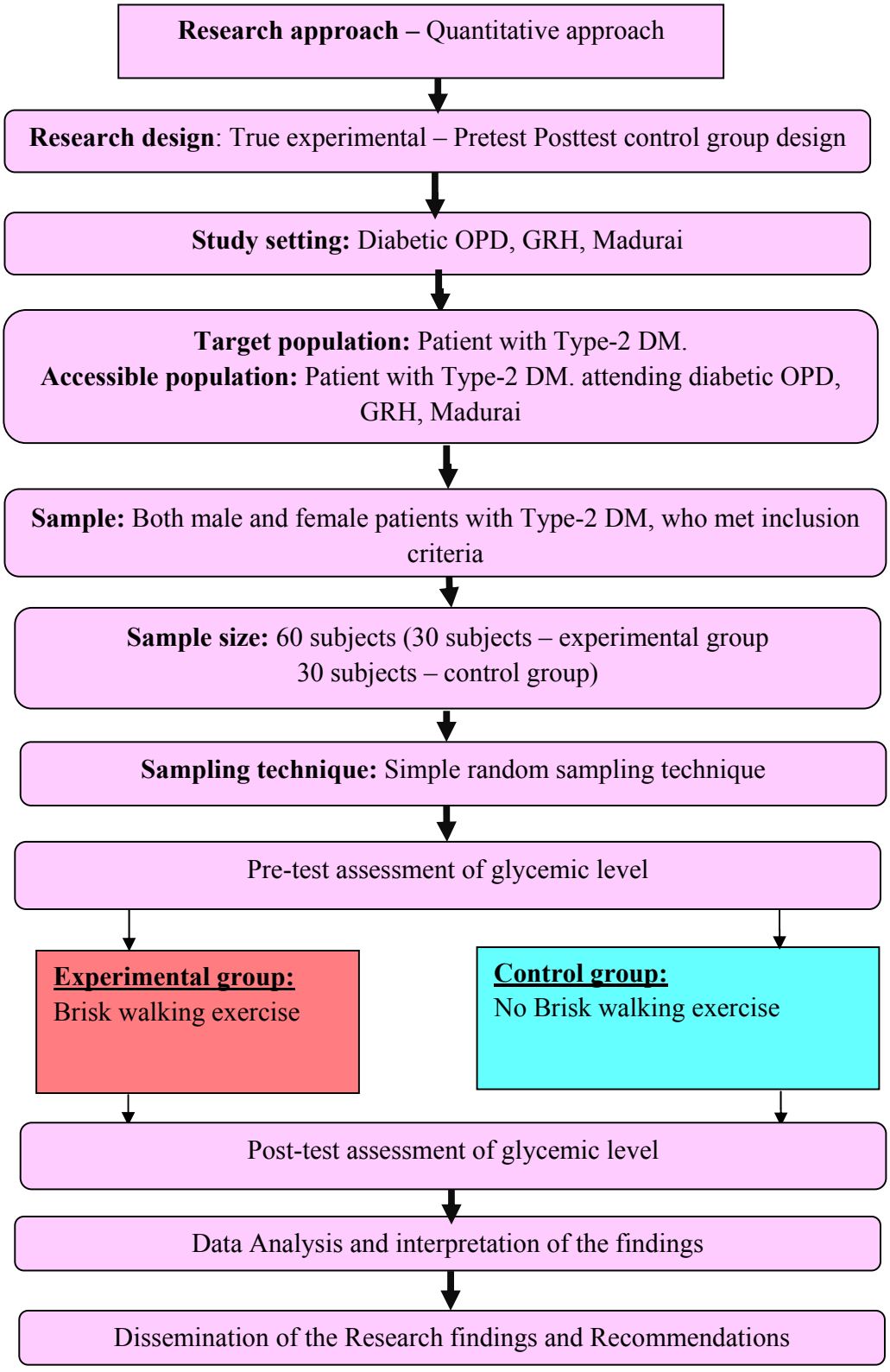
The data analysis was done according to the objectives of the study. Both descriptive and inferential statistics were used. Analysis of the demographic data was done by using the frequency and percentage distribution for both the group. Mean and standard deviation were used to analyze the level of glycemic level among type-2 DM patients. Paired 't' test was used to determine the difference between the pre-test and post-test fasting glycemic level to evaluate the effectiveness of brisk walking exercise. One-way ANNOVA was used to determine the association of glycemic score and the selected demographic and clinical variables.

3.17 ETHICAL CONSIDERATION

The proposed study was conducted after the approval of research committee of College of Nursing, Madurai Medical College, Madurai. The formal approval was obtained from the Head of the Department from Diabetology. Informed written Consent was obtained from each subject before starting the data collection. Confidentiality was maintained for each subject. The name of the subjects was not disclosed at any time.

Assurance was given that they can withdraw from the study at anytime. The possible benefit of participating in the study was explained to all the subjects and anonymity was maintained throughout the study.

FIGURE-2. SCHEMATIC REPRESENTATION OF METHODOLOGY



Data Analysis And Interpretation

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

Analysis is a method of rendering data in quantitative, meaningful and intelligible manner, so that research problem can be studied and tested and the relationship between the variables can be found. **Polit and hungler (1996)**.

This chapter deals with the analysis and interpretation of data collected from 60 Type-2 diabetes mellitus samples who attended the diabetic outpatient department, Government Rajaji hospital, Madurai. This study was done to evaluate the effectiveness of brisk walking exercise among patients with type-2 diabetes mellitus in relation to reduction of glycemic level. The data have been analyzed and presented as follows.

Section –I:

- Distribution of samples according to their Demographic variables.
- Distribution of samples according to their clinical variables.

Section – II:

- Distributions of pretest glycemic level among patients with type 2 diabetes mellitus for experimental and control group.

Section – III

- Description of effectiveness of brisk walking exercise by mean glycemic level among patients with type 2 diabetes mellitus between pretest and posttest of the experimental group.

Section – IV

- Comparison of mean glycemic level between pretest and posttest among the type-2 diabetic patients of both experimental and control group.

Section – V

- Association of mean glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variable.

SECTION – I

Distribution of samples according to their Demographic variables.

Table -1.

Frequency and percentage wise distribution of demographic variables among subjects with type-2 diabetes mellitus in control and experimental group.

n- 30+30 = 60

S. No	Demographic data	Control group		Experimental group	
		Frequency	Percentage	Frequency	Percentage
1.	**Age:**				
	a) 31-35 years	6	20	6	20
	b) 36-40 years	5	16.7	7	23.3
	c) 41-45 years	13	43.3	9	30
	d) 46-50 years	6	20	8	26.7
2.	**Gender:**				
	a) Male	20	66.7	20	66.7
	b) Female	10	33.3	10	33.3
3.	**Religion:**				
	a) Hindu	22	73.3	25	83.3
	b) Christian	2	6.7	1	3.3
	c) Muslim	6	20	4	13.3
	d) Others	0	0	0	0
4.	**Educational status:**				
	a) No formal education	9	30	8	26.7
	b) Primary	16	53.3	17	56.7
	c) High school	4	13.3	4	13.3
	d) Graduate	1	3.3	1	3.3
5.	**Nature of job:**				
	a) Sedentary	9	30	10	33.3
	b) Moderate	19	63.3	18	60
	c) Heavy	2	6.7	2	6.7
6.	**Family monthly income:**				
	a) 3000-4000				
	b) 4001-5000	5	16.7	2	6.7
	c) 5001-6000	20	66.7	19	63.3
	d) Above 6000	4	13.3	8	26.7
		1	3.3	1	3.3
7.	**Marital status:**				
	a) Married	26	86.7	26	86.7
	b) Unmarried	0	0	0	0
	c) Widow/widower	4	13.3	4	13.3
	d) Separated	0	0	0	0

The above table reveals the background data among type-2 diabetic subjects for experimental and control group such as age, gender, Religion, educational status, Nature of job, Family monthly income and marital status.

Regarding **Age**, majority of study participants, (control group 43.3%, experimental group 30.0%) between the age of 41-45 years, the (16.7%) in the control group and (23.3%) subjects in the experimental group between the age of 36–40 years. The (20%) of study participants in the both groups between the age group of 31-35years. Remaining (26.7%, 20% experimental and control group respectively) belongs to 46- 50 years.

With regard to **Gender**, most of study participants 20 (66.7%) were males and remaining 10(33.3%) were females in both experimental and control group.

The variable of **Religion** indicates that the majority of study participants (73.3%, 83.3% in control and experimental group respectively) were Hindus. The (20%) of subjects in control group, and (13.3%) in the experimental group were Muslim and remaining (6.7% 3.3% in control and experimental group respectively) were Christian.

As for as **Educational status**, the majority of study participants received primary education. (56.7%, 53.3% in experimental and control group respectively). Some of them (26.7%, 30% in the experimental and control group) were in no formal education, only (13.3%) subjects in the both groups were received high school education, and least subjects (3.3%) in the both groups received Graduate.

Regarding **Nature of job**, it shows that majority of subjects (60%, 63.3% in experimental and control group respectively) were in the moderate workers and it shows

(33.3%) in experimental and (30%) in the control group were in the sedentary worker. Only (6.7%) of subjects in the both groups doing heavy occupation.

In the earning perspective of **family monthly income**, majority of study participants (63.3%, 66.7% in experimental and control group respectively) were in the income between Rs. 4001-5000. The (26.7%) in the experimental group and (13.3%) in the control group were in the income of Rs.5001-6000, (6.7%) in the experimental , and (16.7%) in the control group were in the income of Rs. 3000-4000, remaining (3.3%) subjects in the both groups were in the income of above Rs.6000.

Regarding **marital status,** majority of the study subjects 26 (86.7%) in the both groups were married. Remaining 4 (13.3%) were widow/widower in both groups, and none of them are unmarried or separated.

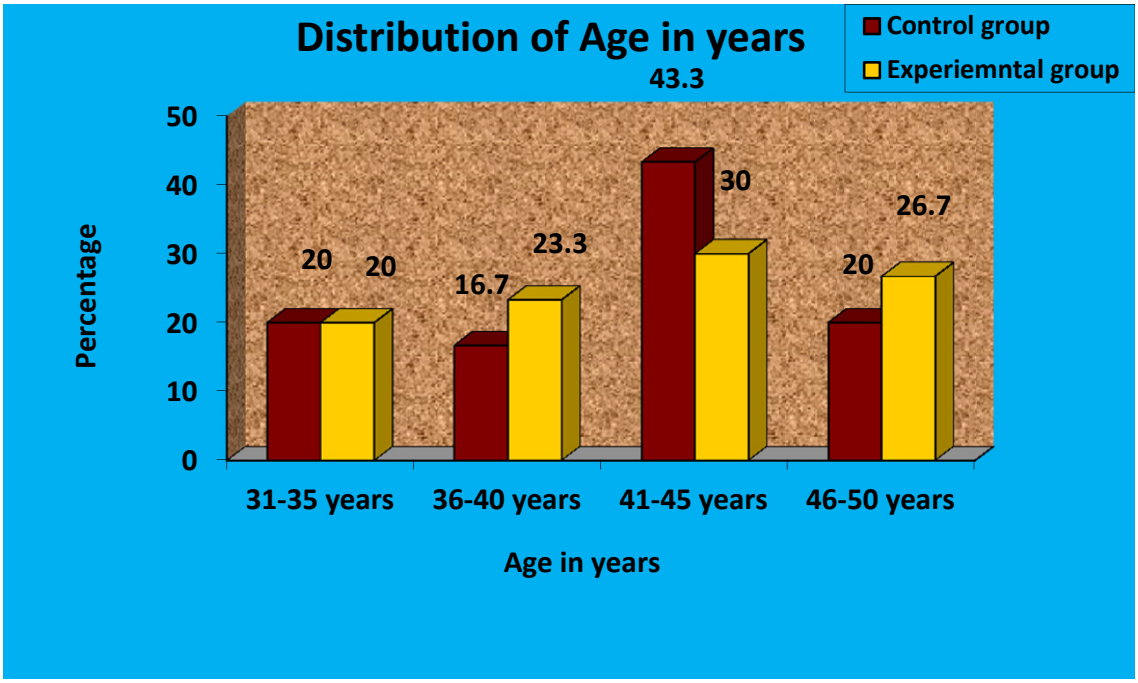


Fig.3. Percentage wise distribution of study participants according to their age.

Multiple bar diagram shows, majority of study participants (43.3%) in control group and (30%) in the experimental group were in 41-45 years, 20% of study subjects were in the age group of 31-35 years in both the groups.

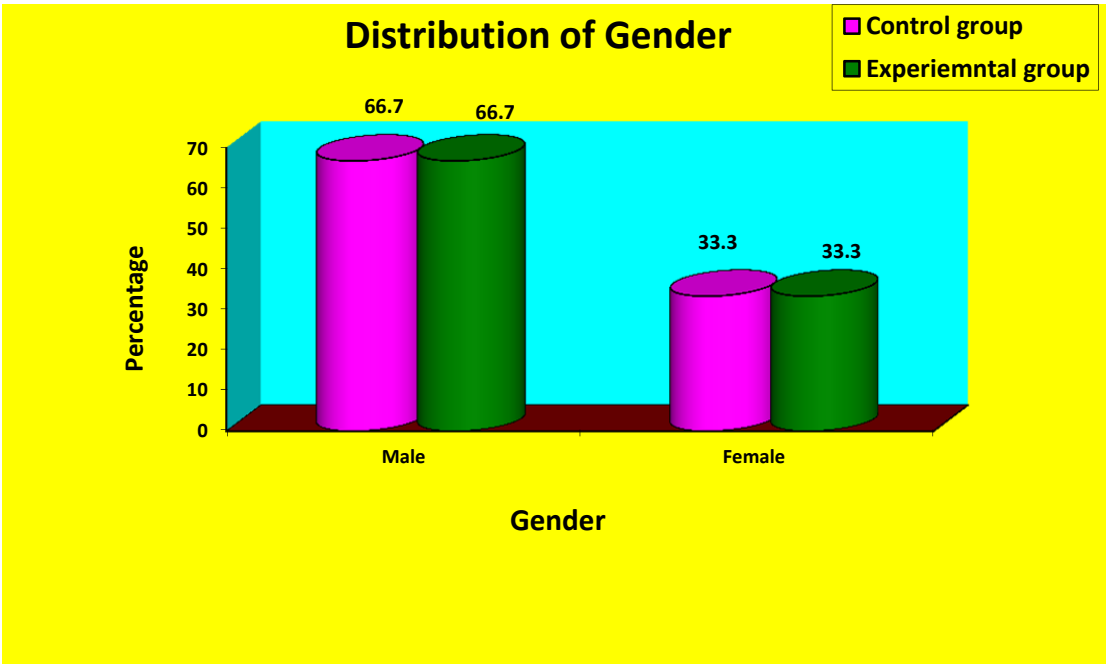


Fig.4. Percentage wise distribution of study participants according to their gender.

Multiple cylinder diagram showing, the majority of subjects 66.7% in this study were male and the remaining 33.3% were female in both the groups

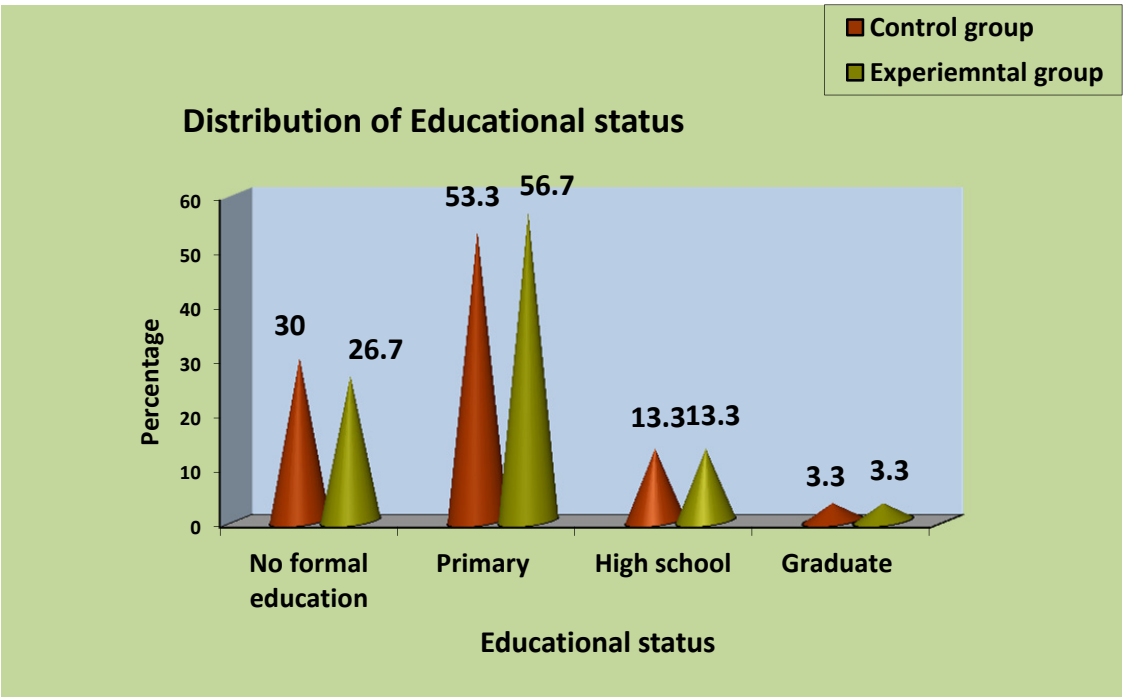


Fig.5 . Percentage wise distribution of study participants according to their educations

Multiple cone diagram shows, the highest percentage of participants received primary education. (56.7%, 53.3% in experimental and control group respectively). Only least subjects (3.3%) studied up to graduates in both groups.

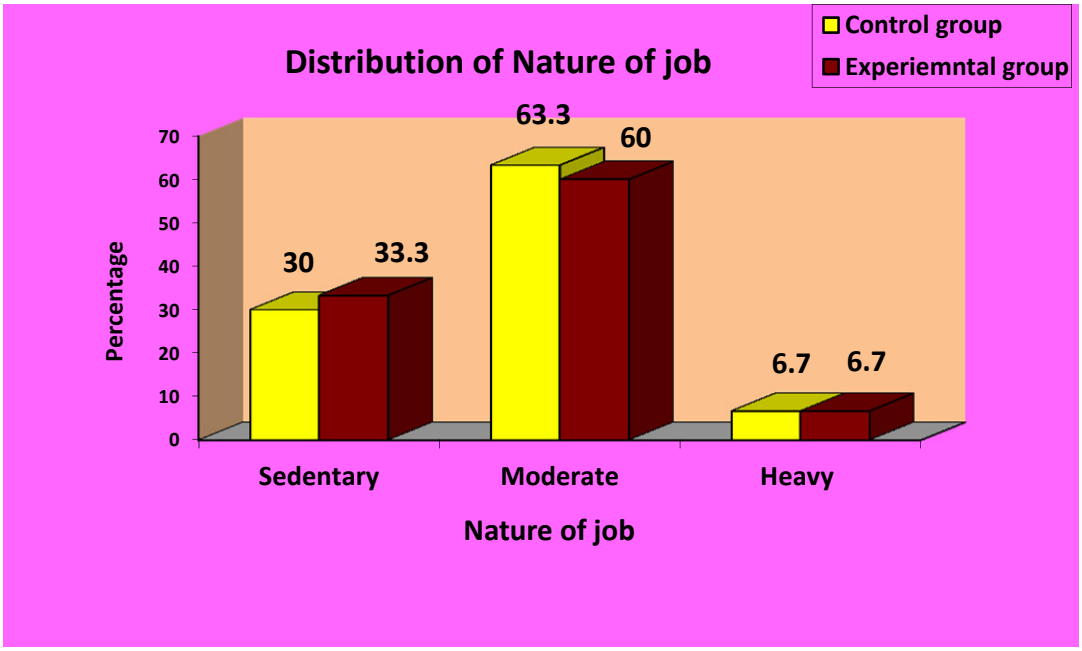


Fig.6 Percentage wise distribution of study participants according to their nature of job.

Multiple bar diagram shows, most of study participants (63.3%, 60.0% in control and experimental group respectively) were in moderate worker, only least subjects (6.7%) are doing heavy occupation in both groups.

Table - 2

Frequency and percentage wise distribution of clinical variables among subjects with type-2 diabetes mellitus in control and experimental group.

n- 30+30=60

S. No	CLINICAL VARIABLES	GROUP			
		Control group		Experimental group	
		N	%	N	%
8.	**Duration of illness:**				
	a) 1-2 years	19	63.3	21	70
	b) 3-4 years	9	30	9	30
	c) 5-6 years	2	6.7	0	0
	d) More than 6 years	0	0	0	0
9.	**History of Diabetic mellitus in your family:**				
	a) Parents	13	43.3	18	60
	b) Parental relatives	2	6.7	1	3.3
	c) No family history	15	50	11	36.7
10.	**Your drugs for Diabetic mellitus:**				
	a) Metformin	8	26.7	7	23.3
	b) Glipizide	0	0	0	0
	c) Glibenclamide	0	0	1	3.3
	d) Metformin & glipizide	12	40	9	30
	e) Metformin & glibenclamide	10	33.3	13	43.3
	f) Others	0	0	0	0
11.	**History of previous hospitalization :**				
	a) Hypoglycemia	0	0	0	0
	b) Hyperglycemia	2	6.7	4	13.3
	c) Others	9	30	11	36.7
	d) No history	19	63.3	15	50
12	**Type of diet:**				
	a) Vegetarian	6	20	7	23.3
	b) Non-vegetarian	24	80	23	76.7
13	**Prescribed diet for diabetic mellitus:**				
	a) Regularity	11	36.7	9	30
	b) Irregularly	16	53.3	18	60
	c) Rarely	3	10	3	10
	d) Not taken	0	0	0	0
14.	**Blood sugar level:**				
	a) Monthly once	0	0	2	6.7
	b) Two months once	8	26.7	7	23.3
	c) Three months once	22	73.3	21	70
	d) Occasionally	0	0	0	0
15.	**BMI**				
	a) Normal	9	30	9	30
	b) Over weight	16	53.3	14	46.7
	c) Obese	5	16.7	6	20
	d) Extremely obese	-	-	1	3.3

The above table shows the Diabetic mellitus related information of experimental and control group subjects those who were participated in this study.

With regards to the **Duration of illness**, the majority of study participants had the diabetes in the duration of 1 – 2years, (63.3%, 70% in the control and experimental group respectively). Remaining of the study participants (30%) had diabetes in the duration of 3-4 years in both groups.

Regarding the **family history of Diadetes mellitus,** most of study subject's parents had the diabetes mellitus. (43.3%, 60% in the control and experimental group respectively). In that (6.7%) in the control and (3.3%) in the experimental group subject's parental relatives had diabetes mellitus and remaining of the subjects (50%, 36.7% in the control and experimental group respectively) had no family history of diabetes.

In taking of **Drug**, all study participants, (100%) in both the groups taking oral hypoglycemic medications for diabetes. In that 10(33.3%) subjects in the control and 13(43.3%) in the experimental group were taking tablet. Glebenclamide 5mg and Metformin 500mg twice daily. Only (26.7%) of subjects in the control and (23.3%) in the experimental group were taking Tablet. Metformin 500mg twice daily. And remaining of subjects 12(40%) in the control and 9(30%) in the experimental group were taking tablet glipizide 5mg and Metformin 500mg twice daily.

With regards to the **previous hospitalization**, majority of study participants were not exposed in hospitalization (63.3%, 50% in control and experimental group respectively). Only some of subjects (6.7%) in the control and (13.3%) in the experimental group were admitted for hyperglycemia and remaining participants (30%,

36.7% in the control and experimental group respectively) admitted for other than the hyperglycemia and hypoglycemia. None of the subjects in the both groups was admitted for hypoglycemia.

With regards to the **food habits**, majority of study participants were taking non-vegetarian diet (80%, 76.7% in the control and experimental group respectively), and remaining subjects were taking vegetarian diet. (20%, 23.3% in the control and experimental group).

In **Diabetic diet**, the most of the participants were following the diet regimen irregularly (53.3%, 60% in the control and experimental group respectively). Only (36.7%) in the control group and (30%) in the experimental group were following diabetic diet regularly and least subjects (10%) in the both groups following diabetic diet rarely.

In the **monitoring of glucose level**, most of the study participants were monitoring the glycemic level three months once regularly. (73.3%, 70% in the control and experimental group respectively). Remaining 8(26.7%) in the control and 7(23.3%) in the experimental group were monitoring the glycemic level two months once and only 2(6.7%) in the experimental subjects were monitoring the glycemic level monthly once.

With regards of **BMI**, majority of study participants were in overweight, (53.3%, 46.7% in the control and experimental group respectively). Only (30%) in the both groups were in the normal body weight, and (16.7%) subjects in the control and 6(20%) in the experimental groups were in the obese. Remaining (3.3%) in the experimental subject in extremely obese.

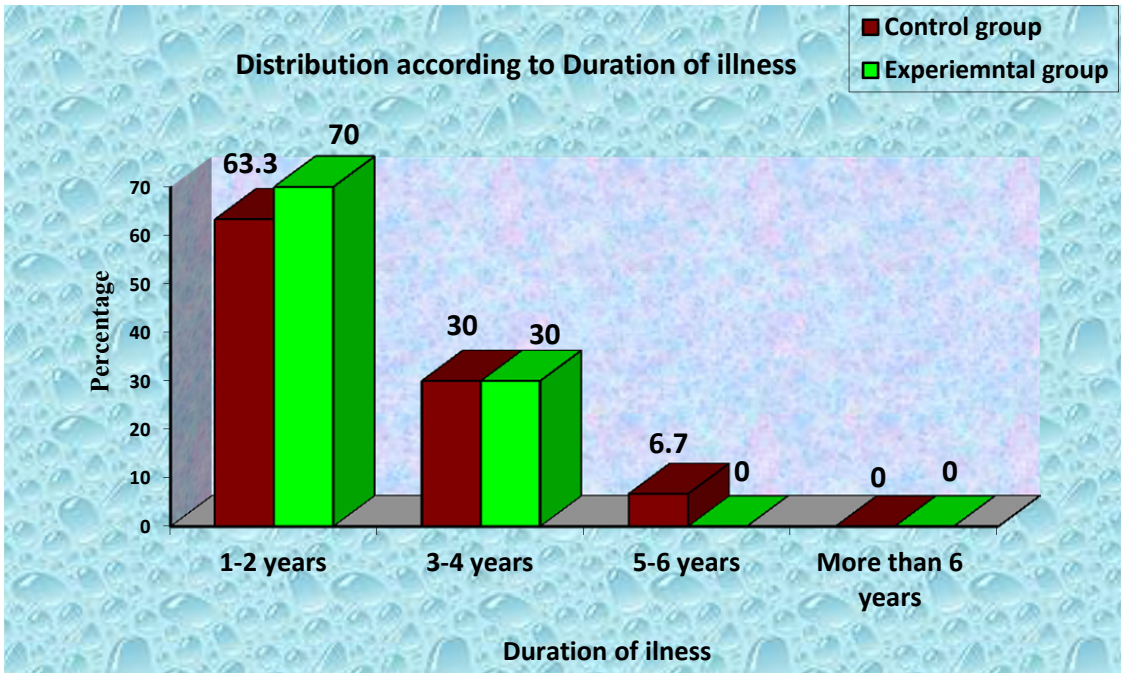


Fig.7. Percentage wise distribution of study participants according to their duration of illness.

Multiple bar diagram shows, the majority of subjects (63.3%) in the control group and (70%) in experimental group had the diabetes in the duration of 1–2 years. Remaining of subjects (30%) in both the group had the diabetes in the duration of 3-4 years.

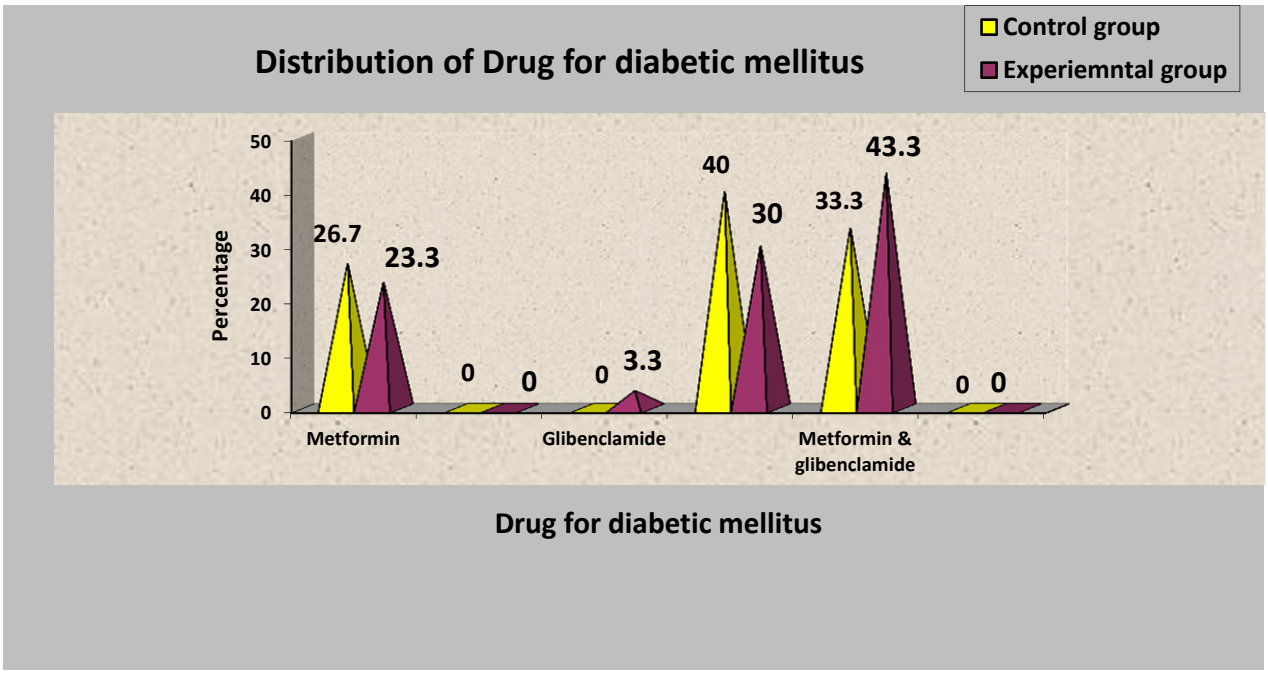


Fig.8. Percentage wise distribution of study participants according to their drug for diabetic mellitus.

Multiple pyramid diagram showing, most of participants (33.3%) in the control and (43.3%) in the experimental group were taking tablet .Glebenclamide 5mg and Metformin 500mg twice daily and 12(40%) in the control and 9(30%) in the experimental group were taking tablet glipizide 5mg and Metformin 500mg twice daily.

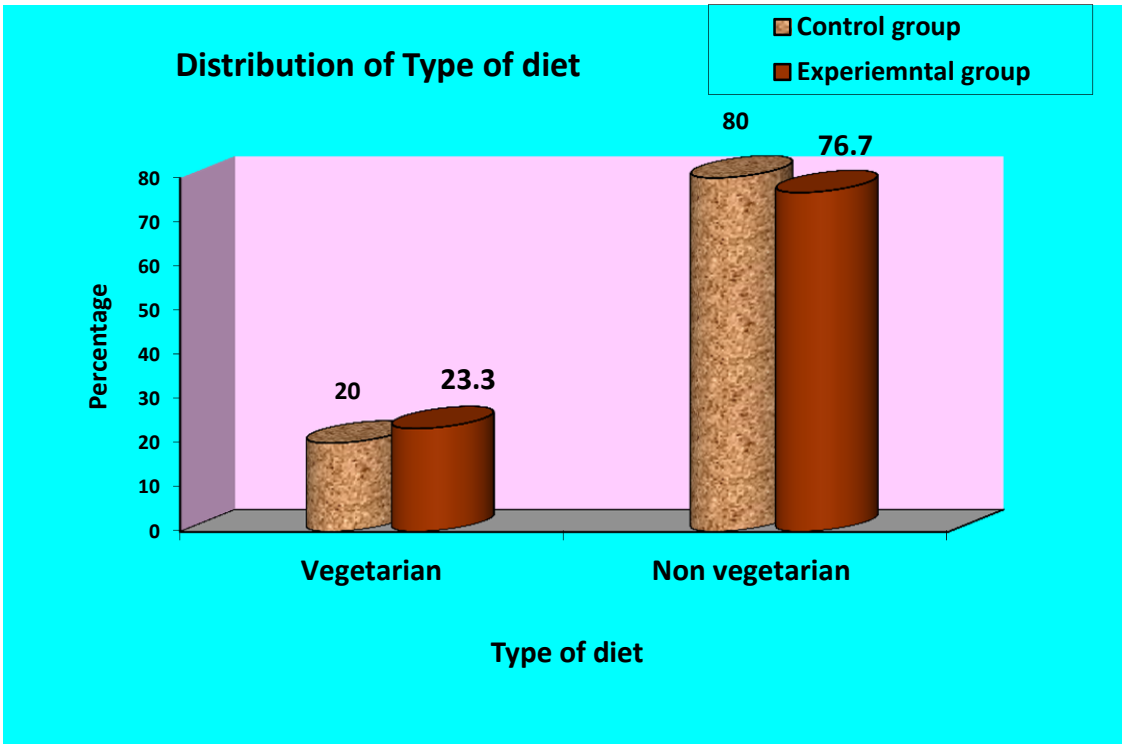


Fig.9. Percentage wise distribution of study participants according to their type of diet.

Multiple cylinder diagram showing, most of study participants were taking non-vegetarian diet, (80%, 76.7% in the control and experimental group respectively). Only least participants following vegetarian diet (20%, 23.3% control and experimental group).

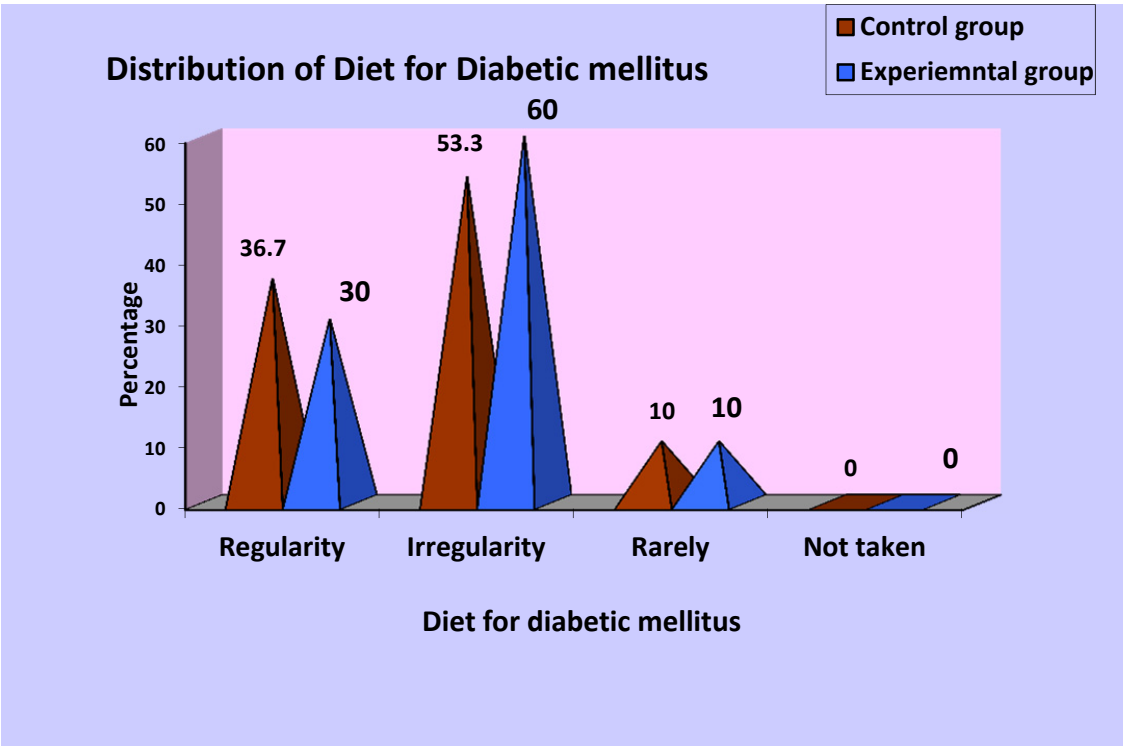


Fig.10. Percentage wise distribution of study participants according to their diet for diabetic mellitus.

Multiple pyramid diagram showing, the majority of study participants (53.3%) in the control group and (60%) in the experimental group were following the diabetic diet irregularly. Only (36.7%) in control and (30%) in experimental group were following diabetic diet regularly.

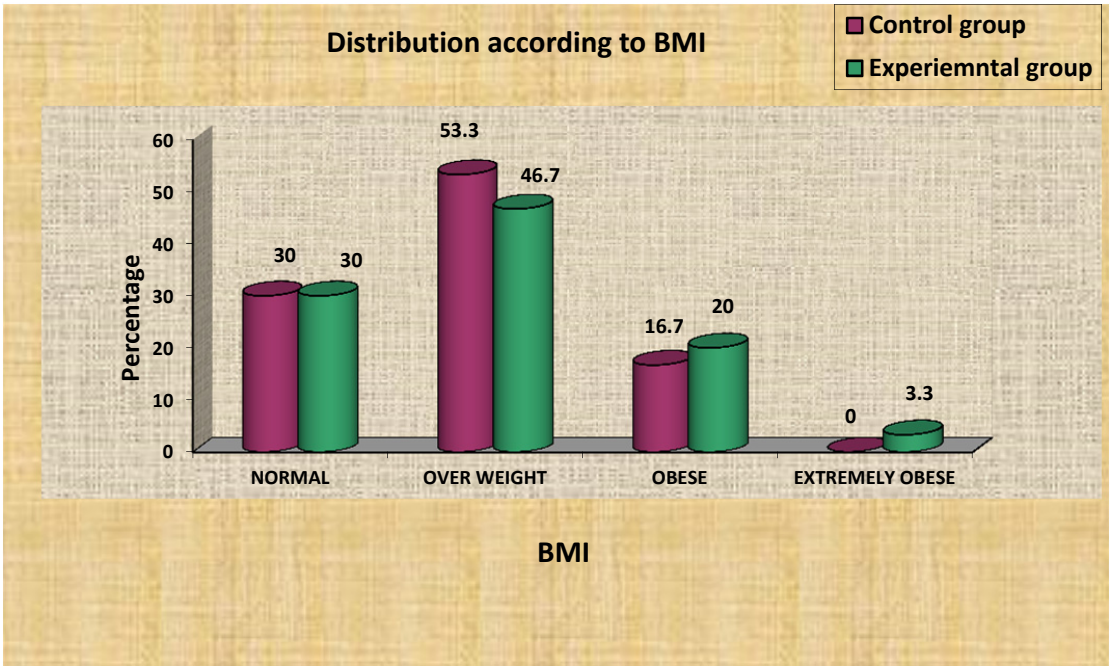


Figure.11. Percentage wise distribution of respondents according to their BMI

Multiple cylinder diagram shows, the majority of study participants (53.3%) in the control group and (46.7%) in the experimental group were in overweight. Only (16.7%) in control group and (20%) in the experimental group were in obese.

SECTION – II

This section deals with the distribution of pretest fasting glycemic level for experimental and control group.

Table 3

The frequency and percentage wise distribution of pretest fasting glycemic level for experimental and control group

Fasting glycemic level in mgs%	PRE TEST			
	Control group		Experimental group	
	N	%	N	%
80 – 120	2	6.7%	3	10%
121 – 160	8	26.7%	7	23.3%
161 – 200	6	20.0%	7	23.3%
201 – 250	14	46.6%	13	43.4%
Total	30	100.0%	30	100.0%

The above table depicts that in the **pretest,** among the control group 6.7% of the type-2 diabetes mellitus subjects were in the range of 80-120mgs of fasting glycemic level, 26.7% of them were in the range of 121-160 mgs and 20% of them are having 161-200 mgs, and also 46.6% of them were in the range of 201-250 mgs fasting glycemic level.

Among the Experimental group, 10% of the type-2 diabetes mellitus subjects were in the range of 80- 120 mgs of fasting glycemic level, and 23.3% of them were in the range of 121-160 mgs. Only 23.3% of them were in the range of 161-200 mgs of fasting glycemic level and 43.4% of them were 201-250 mgs.

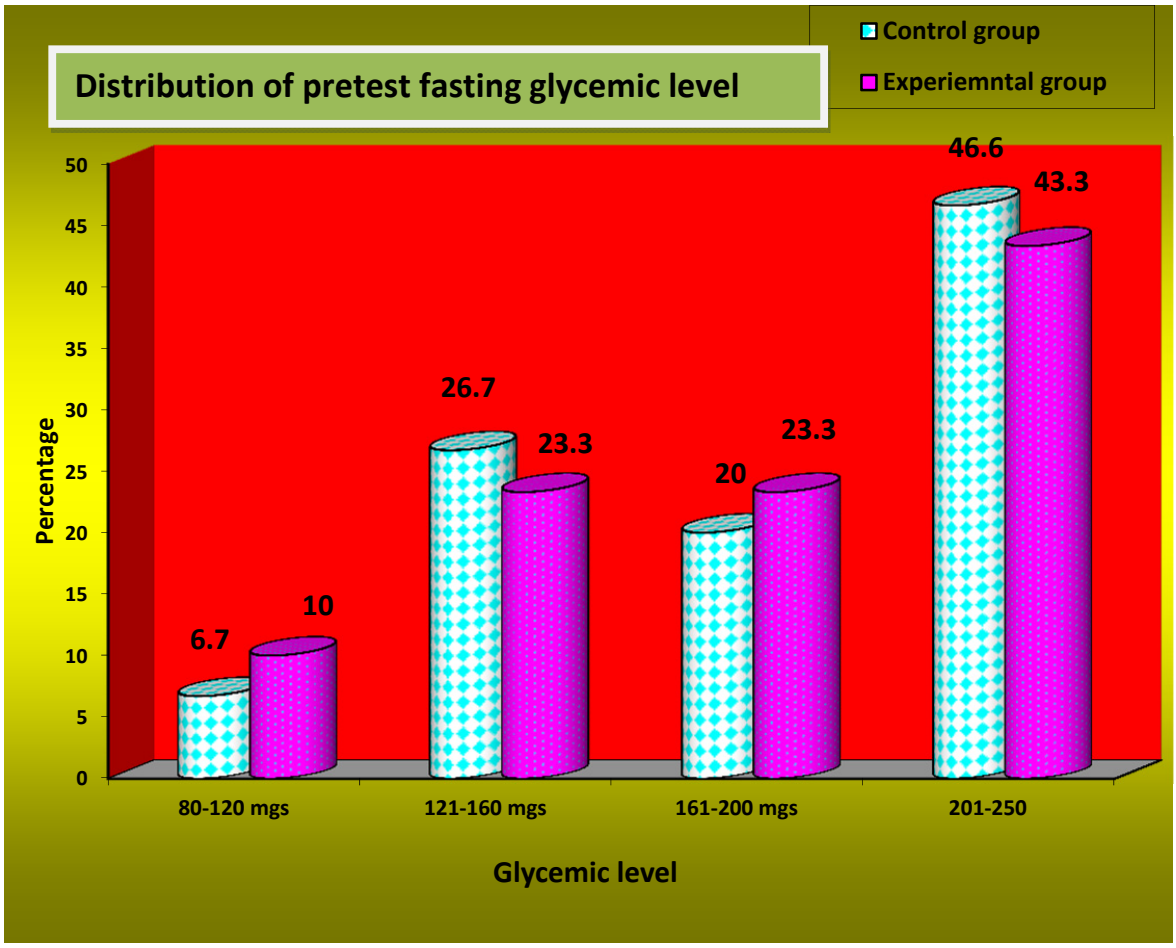


Figure – 12, multiple cylinder diagrams shows the pretest fasting glycemic level of experimental group and control group

In the pretest, the majority of subjects 46.6% in the control group and 43.3% in the experimental group had the fasting glycemic level is in between 201-250 mgs. Only least subjects had the fasting glycemic level is in between 80-120 mgs (6.7%, 10% control and experimental group respectively).

Table 4

The mean, SD, and 't' value of pretest fasting glycemic level of experimental and control group

	Control group		Experimental group		Mean difference	't'-value	P-value
	Mean	SD	Mean	SD			
Pre test	185.57	40.26	184.97	40.25	0.6	**0.0577**	**0.9542 No significance**

(*** P<0.001 highly significant)

The above table depicts that, Mean glycemic level is 184.97 among experimental group and it is 185.57 among control group. The standard deviation among experimental group is 40.25 and in the control group is 40.26.

The obtained 't' value is t=0.0577(P=0.9542) and it **shows statistically there is no significant difference between experimental and control group.** The un paired t-test was used to test the significance.

SECTION-III

This section deals with the effectiveness of brisk walking exercise by mean glycemic level between pretest and posttest of the experimental group

Table 5

The mean, SD, and‘t’ value of fasting glycemic level between pretest and posttest in experimental group.

Subjects	Experimental pre test		Experimental post test		Mean difference	‘t’-value	P-value
	Mean	SD	Mean	SD			
	184.97	40.25	145.13	33.2	39.83	12.58	P<0.001 **Highly significance**

(*** P<0.001 highly significant)

The above table presents effectiveness of brisk walking exercise between pretest and posttest fasting glycemic level in experimental group which was analyzed by using paired t-test.

The mean posttest fasting glycemic level was 145.13 which was lower than the mean pretest fasting glycemic level of 184.97. The mean difference level is 39.83. **The obtained ‘t’ value 12.58 was statistically highly significant at P<0.001 level by using paired ‘t’ test.**

Section – IV

Comparison of pretest and posttest fasting glycemic level between the experimental and control group

Table 6

The frequency and percentage distribution of pretest and posttest fasting glycemic level for control and experimental group.

Fasting glycemic level in mgs%	Control group				Experimental Group			
	Pre test		Post test		Pre test		Post test	
	F	%	F	%	F	%	F	%
80-120	2	6.7	2	6.7	3	10	8	26.7
121-160	8	26.7	8	26.7	7	23.3	13	43.3
161-200	6	20	6	20	7	23.3	8	26.7
201-250	14	46.6	14	46.6	13	43.3	1	3.3
Total	30	100	30	100	30	100	30	100

In the **control group**, Pre and posttest level of fasting glycemic level is remaining same. 6.7% of the type-2 diabetes mellitus subjects were in the range of 80-120mgs of fasting glycemic level, and 26.7% of them were in 121-160mgs. Remaining 20% of them were in 161-200 mgs and 46.6% of them were in 201-250 mgs of fasting glycemic level.

Among **experimental group**, in pretest (10%) of the type-2 diabetes mellitus subjects were in the range of 80-120mgs, (23.3%) of them were in 121- 160 mgs, 23.3% were in 161-200 mgs and 43.3% of them were in the range of 201-250 mgs of fasting glycemic level.

In posttest 26.7% of the type-2 diabetes mellitus subjects were in the range of 80-120mgs, 43.3% of them were in 121- 160 mgs, 26.7% of were in 161-200 mgs and only 3.3% of them were in the range of 201-250 mgs of fasting glycemic level.

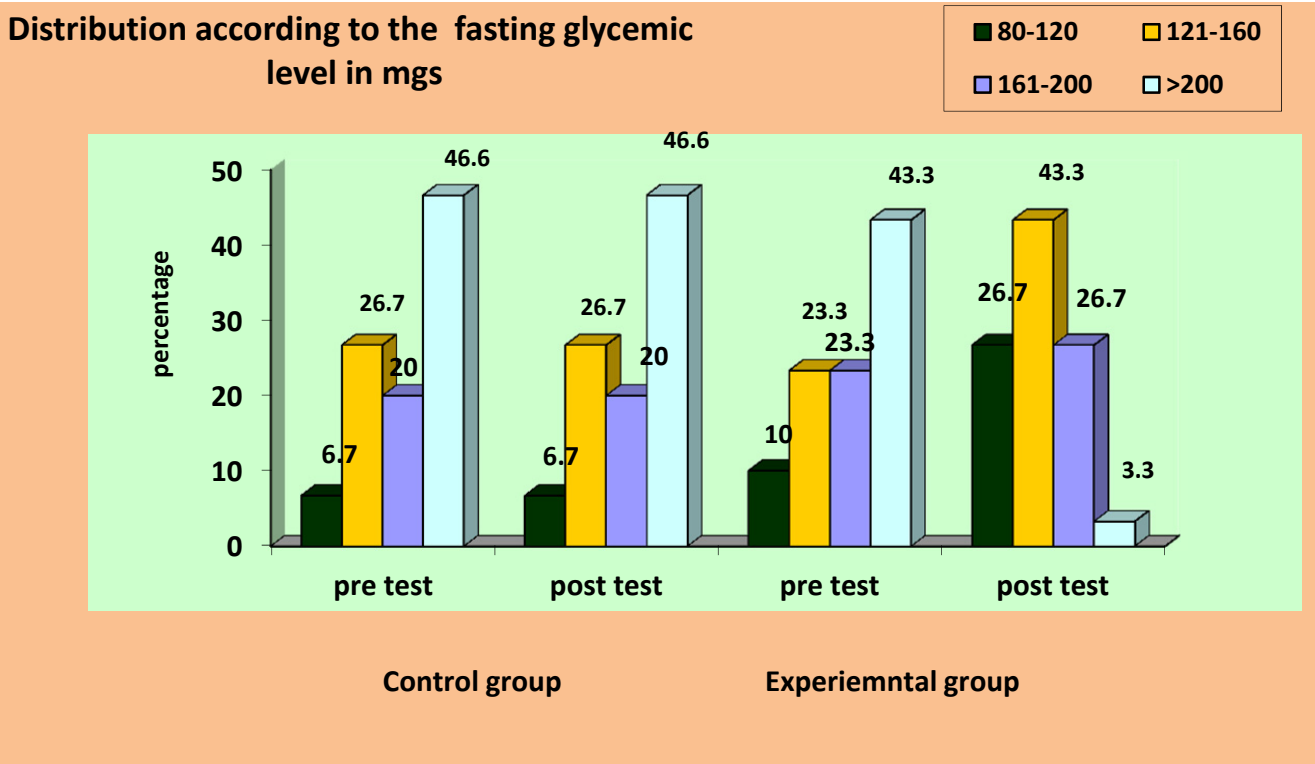


Figure 13. Multiple bar diagram showing Comparison of pretest and posttest fasting glycemic level between the experimental and control group

In experimental group the majority of the study participants, (43.3%) posttest fasting glycemic level is in between 121-160mgs, but in the pretest it was 23.3% only.

In control group, the majority of the study participants, (46.6%) had fasting glycemic level in between 201-250mgs. This percentage level is same in pre and posttest.

Table 7

Comparison of the mean, SD, and‘t’ value of fasting glycemic level between pretest and posttest in experimental and control groups

Subjects	Experimental		Control		‘t’ and p Value
	Mean	SD	Mean	SD	
Pretest	184.97	40.25	185.57	40.26	‘t’- 0.0577, P- 0.9542 **no significance**
Posttest	145.13	33.2	187.17	41.38	‘t’-4.34,P-0.000***Highly significance
‘t’ and p Value	‘t’-12.58, P-<0.001 **Significance**		‘t’- 2.11, P -0.051 **No significance**		**DF-29**

(*** P<0.001 highly significant

***Significant at P≤0.05**highly significant at P≤0.01 *** very high significant at P≤0.001**

The above table represents the Comparison of pretest and posttest fasting glycemic level between the experimental and control groups which was analyzed by using paired and unpaired‘t’-test.

In the **pretest**, the above table depicts that, Mean glycemic level is 184.97 among experimental group and it is 185.57 among control group. The standard deviation among experimental group is 40.25 and in the control group.

The obtained‘t’ value is t=0.0577(P=0.9542) and it shows **statistically there is no significant difference between experimental and control group in pretest level**. The unpaired t-test was used to test the significance.

In the posttest,

Mean fasting glycemic level is 187.7 among control group and it is 145.13 among experimental group. The standard deviation among control group is 41.38 and in the experimental group are 33.2. The mean difference is 42.04.

The obtained‘t’ value is t=4.34(P=0.000) and it shows **statistically there is a significant difference between experimental and control group after practicing the brisk walking exercise**. It confirmed using unpaired t-test.

In **Pre and posttest level**

The experimental group mean posttest fasting glycemic blood level was 145.13 which was lower than the mean pretest fasting glycemic level of 184.97. **The obtained ‘t’ value 12.58 was statistically, highly significant at P<0.001 level by using paired ‘t’ test.**

In control group, the mean posttest fasting glycemi level was 187.17 which was slightly higher than the mean pretest fasting glycemic level of 185.57. **The obtained ‘t’ value 2.11 was statistically not significant.**

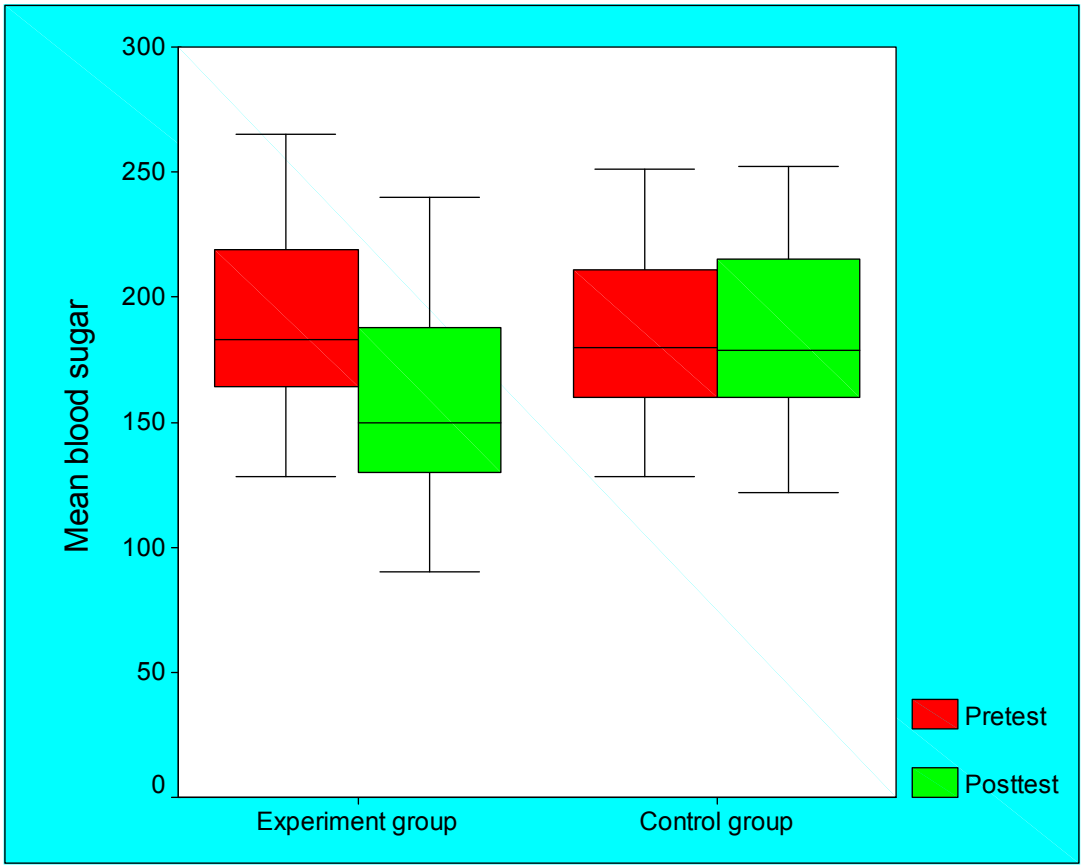


Fig 14: BOX-PLOT compares the pretest and posttest fasting glycemic level between experimental and control group

Among the experimental group, the pretest mean glycemic level was 184.97 and posttest glycemic level was 145.13 and the mean difference between pretest and posttest was 39.83. Among the control group the pretest mean glycemic level was 185.57 but in the post test was 187.17 and the mean difference was only 1.6.

SECTION – V

This section deals with the association of fasting glycemic level and selected demographic variables. (such as age, sex, education, nature of job, duration of illness, dietary pattern and body mass index). (Control and experimental group).

Table 8

Association between the score of fasting glycemic level and selected demographic and clinical variables.(such as age, gender, education, nature of job, duration of illness, dietary pattern and body mass index).

(Control group)

Demographic variables	Pre test		Post test		difference		One way ANOVA F-test/t-test	p-value
	Mean	SD	Mean	SD	Mean	SD		
1.Age:								
31-35 years	187.67	38.77	188.17	40.72	3.83	1.47		
36-40 years	204.8	27.88	207.8	32.59	5	2.54	F=0.59,	0.626
41-45 years	186.93	46.21	187.62	47.06	3.46	2.66	Df=3,26	
46-50 years	164.5	35.14	168	35.22	3.5	1.64		
2.Gender:								
Male	174	41.38	175.65	43.3	3.75	2.42	t=0.17,	0.865
Female	208.7	26.77	210.2	25.88	3.9	1.91	df=58	
3.Educational status:								
No formal education	176	37.29	179.4	36.4	3.44	2.19		
Primary	183.56	39.38	183.4	40.5	3.69	1.82	F=1.32,	0.289
High school	208	54.46	211	58.2	4	3.56	df=3,26	
Graduate	214	0	222	0	8	0		
4.Nature of job:								
Sedentary	182.11	40.41	184.3	40.83	2.22	1.48		
Moderate	193.53	37.29	194.3	39.93	4.32	2.24	F=4.66,	0.018*
Heavy	125.5	19.09	131.5	19.09	6	0	df=2,27	

Demographic variables	Pre test		Post test		difference		One way ANOVA F-test/t-test	p-value
	Mean	SD	Mean	SD	Mean	SD		
5.Duration of illness:								
1-2 years	184.36	41.4	185.47	42.5	4.36	2.36	F=1.96, df=2,27	0.160
3-4 years	202.56	24.79	205.56	25.3	3	1.80		
5-6 years	120.5	9.19	120.53	6.36	2	0		
More than 6 years	0	0	0	0	0	0		
6.Prescribed diet for diabetic mellitus:								
Regularity	189.54	44.85	192	46.9	3.18	2.48	F=0.74, df=2,27	0.485
Irregularly	187.34	36.83	188.4	38.24	4.06	2.17		
Rarely	161.33	47.61	162.67	42.25	4.67	1.52		
Not taken	0	0	0	0	0			
7.BMI								
Normal	165.78	38.4	166.77	38.9	1.67	0.707	5.93 Df=3,26	0.0032**
Over weight	191.31	39.92	194.4	41.8	4.75	2.05		
Extreme overweight	201.75	43.54	200.25	44.02	4.5	2.52		
Obese	207	0	202	0	5	0		

(*-P<0.05 , significant and **-P<0.01 & ***-P<0.001 , Highly significant)

This above table shows the association between fasting glycemic score and their demographic variables for the control group. Sedentary work (F=4.66, P<0.05), and extreme over weight BMI (t=5.93, P<0.01) were significantly increased blood sugar than others. Apart from this other variables were not significantly associated. Statistical significance calculated using, One way ANOVA F-test and t-test.

Table 9

Association between the score of fasting glycemic level and selected demographic and clinical variables. (such as age, gender, education, nature of job, duration of illness, dietary pattern and body mass index).
(Experimental group)

S. NO	Demographic variables	Pre test		Post test		Difference		One way ANOVA F-test/t-test	p-value
		Mean	SD	Mean	SD	Mean	SD		
1.	**Age:**								
	31-35 years	181.5	22.64	142.8	27.7	38.6	12.4		
	36-40 years	184.6	40.4	136.5	29.7	48	19.3	F=1.2,	0.33
	41-45 years	190.4	53.7	158.3	45.7	32.11	11.7	Df=3,26	
	46-50 years	181.75	39.75	139.5	26.0	42.25	22.56		
2.	**Gender:**								
	Male	183	40.81	144.8	35.5	38.2	16.17	t=0.17,	0.865
	Female	188.9	40.9	145.8	31.47	43.1	19.98	df=58	
3.	**Educational status:**								
	No formal education	185.5	27.9	145.3	25.68	40.12	20.8		
	Primary	183.4	39.02	144.3	33.84	39.12	15.6	F=1.24,	0.315
	High school	180	71.28	145.5	57.49	34.5	15.02	df=3,26	
	Graduate	227	0	156	0	71	0		
4.	**Nature of job:**								
	Sedentary	179.9	39.42	135.1	27.5	44.8	19.86		
	Moderate	187.9	42.28	150.7	37.79	37.22	15.27	F=0.6,	0.55
	Heavy	184	46.67	145.5	17.67	38.5	28.99	df=2,27	
5.	**Duration of illness:**								
	1-2 years	192.5	41.9	150.4	35.9	42.04	16.6		
	3-4 years	167.3	31.4	132.7	25.5	34.67	18.9	t=1.15,	
	5-6 years	0	0	0	0	0	0	df=58	0.294
	More than 6 years	0	0	0	0	0	0		

S. NO	Demographic variables	Pre test		Post test		Difference		One way ANOVA F-test/t-test	p-value
		Mean	SD	Mean	SD	Mean	SD		
6.	**Prescribed diet for diabetic mellitus:**								
	Regularity	189.22	41.8	143.1	36.3	46.11	21.7	F=0.96,	
	Irregularly	184.17	39	147.7	30.9	36.38	15.67	df=2,27	0.485
	Rarely	177	56.2	135.3	53.5	41.67	10.07		
	Not taken	0	0	0	0	0	0		
7.	**BMI**								
	Normal	185.8	42.89	148	38.9	37.8	13.29		
	Over weight	187.8	43.13	146.5	34.2	41.33	17.37	0.21	0.8902
	Extreme overweight	182	39.01	144	28.65	38.5	24.53	Df=3,26	
	Obese	159	0	108	0	51	0		

(*-P<0.05, significant and **-P<0.01 & ***-P<0.001 , Highly significant)

This above table shows, there is no association between fasting glycemic level reduction score and their demographic and clinical variables for the experimental group. Statistical significance calculated using, one way ANOVA F-test and t-test.

Discussion

CHAPTER - V

DISCUSSION

The study was focused to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type-2 diabetic mellitus in Diabetic OPD at Government Rajaji Hospital, Madurai. The study findings are discussed with regard to the objectives, framework and hypotheses.

The present study was designed to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type-2 diabetes mellitus. By practicing the brisk walking exercise, the glycemic level can be maintained within the normal and also the occurrence of complication prevented.

To find out the effectiveness of brisk walking exercise on glycemic level, the researcher adopted true experimental pretest-posttest control group design which had randomization, experimental and control group. In order to maintain the homogeneity among the groups the investigator got permission from the physician not to change the dose of medication up to the study period.

This Research Study has been discussed based on the objectives and the following supported studies.

Demographic variables:

The findings of demographic variables were

With regard to the **Age**, majority of type-2 diabetes subjects in control group 13(43.3%) and 9(30%) in the experimental group were in 41-45 years, and least 5(16.7%)

in the control group, 7(23.3%) in the experimental group were in 36-40 years. The (20%) of study participants in the both groups between 31-35years

The present study was consistent with Saja F.Ghannam et.al (2010), who was performed a retrospective study, Medical laboratory sciences, Rafedia & al watani, Hospital, Nablus to study the relationship between diabetic mellitus and age among 83 samples. The glycemic level was obtained from each sample and the findings were the majority of diabetic cases increases in the age above 40 years. My study also reveals the same report. At the same time diabetes present below the age group of 35 years also. The WHO reports, now diabetes affects the adult population worldwide both the developed and developing countries.

With regard to **Gender**, majority of type 2 diabetic subjects 20 (66.7%) were males and remaining 10(33.3%) were females in both groups.

The variable of **religion** indicates that the majority of subjects (73.3%) in control group, and (83.3%) in the experimental group were Hindus. The (20%) of subjects in control group, and (13.3%) in the experimental group were Muslim and remaining (6.7%) in control group, and (3.3%) in the experimental group were Christian.

As far as **educational status**, majority of study participants (56.7%) in the experimental group and (53.3%) in the control group were in primary education. least study subjects (3.3%) in the both groups were in Graduate.

Regarding **nature of job,** it shows that majority (60%) subjects in experimental group and 19 (63.3%) subjects in control group were in the moderate workers and it

shows (33.3%) subjects in experimental group and (30%) subjects were in the control group were in the sedentary workers.

In the earning perspective of **family monthly income**, majority (63.3%) of subjects in experimental group (66.7%) of subjects in control group were in the income between Rs. 4001-5000. And least (3.3%) subjects in the experimental and control group were in the income of above Rs.6000.

Regarding **marital status,** majority of the subjects 26(86.7%) in the experimental and control group were married. Remaining 4(13.3%) subjects were widow/widower in both group..

Findings on the basis of clinical variables:

With regard to the **duration of illness**, majority of the study participants, (63.3%) in the control group and (70%) subjects in the experimental group had the diabetes in the duration of 1 – 2years, (30%) patients had diabetes in the duration of 3-4 years in both groups.

The data shows in my study, Diabetes grows very rapidly in recent years. Statistics shows, one out of 10 people in Tamil Nadu is diabetic, and every two persons in a group of 25 are in the pre-diabetic stage. **World Health Statistics 2012:** One in six adults obese, one in three hypertensive, one in 10 diabetic. Also included for the first time in the *World health statistics 2012* are data on people with raised blood glucose levels. While the global average prevalence is around 10%, up to one third of

populations in some Pacific Island countries have this condition. Left uncontrolled, diabetes can lead to cardiovascular disease, blindness and kidney failure.

Regarding the **family history of DM**, majority of the study participants (43.3%) subjects in the control group and (60%) in the experimental group subjects parents had the diabetes mellitus and also (50%) in the control group and (36.7%) subjects in the experimental group subject's had no family history of diabetes. It shows, other than family history food habits, less physical activity and life style changes are more prone factors to get Diabetes.

In taking of **drug,** all study participants, (100%) in both the groups taking oral hypoglycemic medications for diabetes. In that, (26.7%) subjects in the control group and (23.3%) subjects in the experimental group were taking single drug regimen- Tablet. Metformin 500mg twice daily. And 10(33.3%) subjects in the control group and 13(43.3%) subjects in the experimental group were taking tablet .Glebenclamide 5mg and Metformin 500mg twice daily. Only 12(40%) subjects in the control group and 9(30%) subjects in the experimental group were taking tablet glipizide 5mg and Metformin 500mg twice daily.

With regard to the **previous hospitalization,** Majority of study participants, (63.3%) in control group and (50%) in the experimental group subjects were not hospitalized. Only (6.7%) subjects in the control group and (13.3%) subjects in the experimental group were admitted for hyperglycemia. None of the subjects in the both groups was admitted for hypoglycemia.

With regard to **food habits** the majority of (80%) subjects in the control group, (76.7%) subjects in the experimental group were taking non-vegetarian diet. and (20%) subjects in the control group, (23.3%) subjects in the experimental group were taking vegetarian diet. My study report reveals non – vegetarian food taking peoples will get more chance for diabetes.

Regarding **diabetic diet**, majority of study subjects (53.3%) subjects in the control group and (60%) subjects in the experimental group were following the diet irregularly. Only (36.7%) in the control group and (30%) in the experimental group were following diabetic diet regularly.

In the **monitoring of glycemic level** majority of the subjects (73.3%) in the control group and (70%) in the experimental group were monitoring glycemic level regularly three months once. Only 2(6.7%) in the experimental subjects were monitoring the glycemic level monthly once.

Regarding the **body mass index,** majority of study participants, (53.3%) in the control group and (46.7%) subjects in the experimental group were in the overweight.

Boffetta, B. et.al., (2011) investigated a pooled cross-sectional analysis in different parts of Asia to evaluate the association between baseline body mass index (BMI, measured as weight in kg divided by the square of height in m) and self-reported diabetes status in over 900,000 individuals recruited in 18 cohorts. This study concludes the strength of the association between BMI and prevalence of diabetes in Asian populations and identified patterns of the association by age, country, and other risk

factors for diabetes. My study also shows the majority of the study participants belong to overweight.

The major findings of the study are discussed in regard to the formulated objectives as follows.

The first objective was to assess glycemic level among Patients with type-2 diabetes mellitus.

In the experimental group, the obtained mean glycemic level was 184.97 and standard deviation was 40.25. In the control group, obtained mean glycemic level was 185.57 and standard deviation was 40.26. The obtained't' value is t=0.0577(P=0.9542) and it **shows statistically there is no significant difference between experimental and control group.** The unpaired t-test was used to test the significance.

The second objective was to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type-2 diabetes mellitus in the experimental group.

The obtained mean posttest fasting glycemic level score is 145.13 which were lower than the mean pretest fasting glycemic level of 184.97 in the experimental group. The obtained't' value was 12.58 at p-value 0.001 level, it is statistically highly significant by using the paired 't' test.

The findings confirm that in pretest there is no significant difference between experimental and control group, but in posttest, it is observed that there was significant difference between the experimental and control group.

The present study findings was consistent with **Thangapandiyan.et.al.,(2012)** who investigated a randomly allocated study to evaluate the role of the brisk walking on fasting blood glucose levels among 20 adult males with type-2 diabetes mellitus. 20 study participants in group underwent brisk walking intervention for 60 minutes daily between 6 AM to 7 AM for 15 consecutive days. The fasting blood glucose levels of study participants were measured using a calibrated glucometer. Significant reduction ($p<0.05$) in fasting blood glucose level of participants has been showed.

American College of Sports Medicine (2010), a study was conducted in America, to investigate the effects of an 8 weeks programme of supervised walking exercise on glycemic control and cardio respiratory fitness in adolescents with NIDDM. The experimental group participated in supervised walking exercise programme in the hospital exercise area for 30 -45 minutes for 3 days a week, for 8 weeks. There was a significant improvement in the experimental group though no statistical significant changes were seen in the control group. It implies that regular, supervised walking exercise programme helps to maintain the glycemic control.

Thus **H_1: there is a significant difference in the glycemic level among patients with type-2 diabetes mellitus before and after brisk walking exercise, -** was accepted.

The third objective to associate the glycemic level among patients with type-2 diabetes mellitus and selected demographic and clinical variables.

The findings suggests that, in experimental group, after intervention there is no association between fasting glycemic level reduction score and their selected demographic and clinical variables. But in control group there is association between

fasting glycemic level and their demographic variables. Sedentary work (F=4.66, P<0.05), and extreme over weight BMI (t=5.93, P<0.01) were significantly increased fasting glycemic level than others. Apart from this other variables were not significantly associated. Statistical significance calculated using, one way ANOVA F-test and t-test.

Thus **H_2: there is no significant association between the glycemic level among patients with type-2 diabetes mellitus and selected clinical and demographic variables** was rejected.

The present study also consistent for exercise and glycemic level**, Senthil Kumar et.al (2011)** who conducted a systematic independent literature search to describe the role of physical activity in prevention and treatment of type-2 DM and its complications among 25 reviews. The result of the study showed that, 14 studies were on prevention only; 7 were on treatment only; 2 were on both prevention and treatment; and 2 were guidelines/ consensus statements. From the prevention studies, physical activity reduced the risk of T2DM by 25-35%. From the treatment studies, physical activity not only reduced HbA1c levels but also enhanced social participation and quality of life. The study had been concluded that **r**egular physical activity such as simple walking for 30min per day for all/most days of the week was shown to prevent and manage T2DM effectively.

Another study also consistent for exercise and glycemic level, **The Da Qing study in China (2011)** a study was conducted, to evaluate the role of physical activity on Diabetes. The study included an exercise-only treatment arm and reported that even modest changes in exercise (20 min of mild or moderate, 10 min of strenuous, or 5 min of

very strenuous exercise one to two times a day) reduced diabetes risk by 46% (compared with 42% for diet plus exercise and 31% for diet alone). Data show that moderate exercise such as brisk walking reduces risk of type-2 diabetes, and this study support the current recommendation of 2.5 h/week of a moderate aerobic activity (Brisk walking exercise) or typically 30 min/day for 5 days/week for prevention and control type-2 DM

Summary, Conclusion & Recommendations

CHAPTER - VI

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

This chapter deals with the summary of the study and conclusions drawn. It also clarifies the implications for different areas like nursing practice, nursing education, nursing research, nursing administrations and recommendations for further research.

6.1 SUMMARY

The present study was aimed at evaluating the effectiveness of brisk walking exercise on glycemic level among the type-2 diabetes mellitus patients in Diabetic outpatient department at Government Rajaji Hospital, Madurai

The objectives of the study were

- To assess the glycemic level among patients with type 2 diabetes mellitus in Diabetic outpatient Department at Government Rajaji Hospital, Madurai.
- To evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type 2 diabetes mellitus in the experimental group.
- To associate the glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variables.

The following hypothesis was tested

H_1 There is a significant difference in the glycemic level among the patients with type 2 diabetes mellitus before and after brisk walking exercise.

H_2 There is a significant association between the glycemic level among patients with type 2 diabetes mellitus and selected demographic and clinical variables.

The conceptual framework adopted was Widen back's helping art of nursing practice. A quantitative approach and true experimental pretest posttest control group design was adopted for the study. The independent variable was brisk walking exercise and the dependent variable was glycemic level.

This study was conducted at the Diabetic OPD at Government Rajaji Hospital, Madurai. The accessible population for the study was type-2 diabetes patients in Diabetic OPD at Government Rajaji Hospital, Madurai.

The study sample size was 60. The study subjects were selected by using probability simple random sampling technique and were assigned to experimental (30) and control group (30).

The data collection tools used were

1. Demographic variables
2. Clinical variables
3. Bio-physiological measurement

Content validity was obtained from one medical expert and four experts specialized in Medical Surgical Nursing for content validity.The tool was found to be valid and reliable through pilot study. Data were collected for a period of 5 weeks from12.08.2014 to 15.09.2014. The subjects in the experimental group received brisk walking exercise with regular drugs and the control group received only the regular drugs. Based on the

objectives and hypothesis, data were analyzed by using frequency percentage, mean, standard deviation, independent paired and unpaired 't' test and one way ANNOVA.

6.2 MAJOR FINDINGS OF THE STUDY

- ✓ With regard to the **Age**, majority of the participants were in the age group of 41-45 years.
- ✓ Regarding **Gender,** majority of study participants were males
- ✓ As far as **educational status**, majority of subjects studied up to primary education, and least subjects in both groups are graduated.
- ✓ In the view of **nature of job,**. Only least subjects are doing heavy occupation.
- ✓ In the earning perspective of **family monthly income**, majority of study participants belongs to low income group
- ✓ With regard to the **duration of illness**, majority of subjects had the diabetes in the duration of 1 – 2years.
- ✓ Regarding the **family history of DM.** most of the subject's parents had the diabetes mellitus..
- ✓ In taking of **drug,** majority of participants followed double-regimen drug.
- ✓ With regard to **food habits** the majority of subjects in the both groups were taking non-vegetarian diet.
- ✓ Regarding **diabetic diet,** majority of participants were not following diabetic diet regularly.
- ✓ In the **monitoring of glycemic level** majority of the subjects were monitoring glycemic level three months once regularly.
- ✓ Regarding the **body mass index,** majority of subjects were in the overweight.
- ✓ The statistical value reveals that, **in pretest** the obtained 't' value is t=0.0577(P=0.9542) and it **shows statistically there is no significant difference**

between experimental and control group. The unpaired t-test was used to test the significance.

- ✓ The statistical value reveals that. **In the posttest,** Mean fasting glycemic level is 187.7 among control group and it is 145.13 among experimental group. The obtained‘t’ value is t=4.34(P=0.000) and it shows **statistically there is significant difference between experimental and control group after practicing the brisk walking exercise**. It confirmed using unpaired t-test.
- ✓ The obtained mean posttest fasting glycemic level score is 145.13 which were lower than the mean pretest fasting glycemic level of 184.97 in the experimental group. The obtained‘t’ value was 12.58 at p-value 0.001 level, it is **statistically highly significant by using the paired ‘t’ test.**
- ✓ The findings confirm that, in pretest there is no significant difference between experimental and control group, but in posttest that, there was significant difference between the experimental and control group.
- ✓ The above results showed that there was a statistically significant reduction of glycemic level in the experimental group after doing the brisk walking exercise but in the control group there was no significant reduction of glycemic level.
- ✓ According to the third objectives findings, there is no association between fasting glycemic level reduction score and their demographic and clinical variables in the experimental group. But in control group, it shows association between fasting glycemic score and their demographic variables. Sedentary work (F=4.66, P<0.05), and extreme over weight BMI (t=5.93, P<0.01) were significantly increased glycemic level than others.

6.3 CONCLUSION

The study findings statistically proved that the brisk walking exercise reduces the fasting glycemic level among patients with type-2 diabetes mellitus. Brisk walking exercise is the simple, best, effective and low cost method. It prevents and controls the Diabetes mellitus, and also reduces the diabetic related complications.

6.4 IMPLICATIONS

The investigator had drawn several implications from this study for various areas such as nursing practice, nursing education, nursing administration and nursing research.

The findings of the present study supports that, brisk walking exercise is safe, effective and low cost almost are not harmful to health. It is proved that the alternative management was effective to reduce fasting glycemic level.

IMPLICATIONS FOR NURSING PRACTICE

- ❖ It's a well-known fact that life style modifications including weight loss, increased physical activity and dietary changes can prevent or delay the onset of diabetes. Inclusion of brisk walking exercise is a part of life style modifications to reduce the incidence of diabetic complications.
- ❖ The findings of the study shown that brisk walking exercise can be practiced by diabetes mellitus patients to reduce the glycemic level.
- ❖ The regular practices of brisk walking exercise help to maintain the glycemic level of patients with diabetes mellitus.
- ❖ It helps the nurses to include brisk walking exercise as a nursing intervention in the management of diabetes mellitus patients.

- The nursing personnel should take initiative in conducting awareness programmes, educational programmes, mass-media campaigns on prevention diabetes mellitus and its complications and also to educate to public on an inclusion of brisk walking exercise which is a cost effective, reduces the need for increasing the dose of drugs and increases the general well- being.
- Demonstrations and video teaching programmes can be arranged for patients with diabetes mellitus regarding brisk walking exercise in outpatient department.

IMPLICATIONS FOR NURSING EDUCATION

- As a nurse educator, we must strengthen the concept of non-pharmacological method for management of diabetes mellitus
- The study will enable the students to compare brisk walking exercise with other therapies for reducing the glycemic level.
- The study will enhance the nursing students to acquire knowledge about brisk walking exercise and its uses in maintaining glycemic level.
- The content can be added to the nursing curriculum so that the students will know about brisk walking exercise and its uses in reducing the glycemic level.

IMPLICATIONS FOR NURSING RESEARCH

- This study can be a baseline for future studies to build upon and motivate the investigators to conduct further studies.
- A study can be done with large samples
- A study can be done for long duration and other biochemical parameters (lipid profile) can be monitored along with glycemic level.

IMPLICATIONS FOR NURSING ADMINISTRATION

- These findings will help the administrators to encourage the nurses to use brisk walking exercise for reducing the glycemic level.
- These findings will be very helpful to the administrators for conducting continuing education programme for nurses regarding alternative therapy..
- The charts regarding brisk walking exercise for diabetes can be fixed in the wards and OPD. So that it can motivate the patients to practice it.

6.5 RECOMMENDATIONS

The study recommends the following further research

- The study can be conducted with large samples to generalize the findings.
- Comparative studies can be conducted between various alternative modalities.
- The study can be conducted in different settings.
- A longitudinal study can be conducted to assess the effectiveness of brisk walking exercise in maintaining the glycemic level.
- The effectiveness of brisk walking exercise can be tested for other disease conditions. (such as hypertension. obesity, hyperlipidemia).

6.6 LIMITATIONS

- Obese men and women felt difficult to do brisk walking exercise initially.
- Some patients experienced economical problem for travelling expenses to come for the study which was overcome by researcher support

References

REFERENCES

BOOKS

1. Adrianne, D. L. (2007*). Introduction to Medical Surgical Nursing.* (4 Eds). Philadelphia: Elsevier Science Limited.

2, Alligard, M R. (2002), *Nursing Theorists and their Work*. (5 Eds). Philadelphia; Mosby company,

3. Basavanthappa, B.T. (2009). *Medical Surgical Nursing*. (2 Eds). New Delhi: Jaypee brothers medical publishers.

4. Barabara, K. Timby. (2007). *Introduction to Medical Surgical Nursing*. London: Lippincott Williams & Wilkins.

5. ChrisBrooker, Maggie Nicol, (2003). *Nursing adults the practice of caring*. Philadelphia: Elsevier Science Limited.

6. Denise, F. (2000), *Nursing Research, Principles and Methods*, (6 Eds), Philadelphia; Lippincott company,

7. DirksenlHeilkemper. Lewis, (2004). *Medical Surgical Nursing* (6 Eds). St. Louis: Mosby Publishers

8. Gupta, S. P. (2002). *Statistical Methods.* New Delhi: Sultan Chand & Sons Publishers.

9. Joyce,M.Black. (2005). *Medical – Surgical Nursing*. (7 Eds). India: Elsevier publication.

10. Kothari,C. R (2004). *Research Methodology- Methods & Techniques.* New Delhi: New Age International Publishers.

11. Kumar and Clark. (2002).*Clinical Medicine*. (5 Eds).W.B. U.K.Saunders Pvt Ltd.

12. Lewis. (2011). *Textbook of Medical Surgical Nursing*. (9 Eds). St. Louis Missouri: Mosby publishers.

13. Linton. (2007). *Introduction to Medial Surgical Nursing*. (14 Eds). Missouri: Saunders Company

14. Lippincott Williams Wilkins. (2010). *Manual of Nursing Practice. (* 9 Eds). New Delhi: Wolters Kluwer (India) Pvt Ltd.

15. Long Phipps. (1993). *Medical Surgical Nursing.*(3 Eds). London: Mosby publishers.

16. Matthew Cahill. (2002). *Mastering medical and surgical nursing*. Edinburgh: Churchil living stone. .

17. Nichola. A. Boon (2006). *Davidson's Principles and Practice of Medicine*. New York: Churchill Livingstone.

18. Mahajan. B. K. (1991). *Methods in Biostatistics.* New Delhi: Jaypee Brothers.

19. Matthew Cahill. (2002). *Mastering medical and surgical nursing.* Edinburgh: Churchill living stone.

20. Pareek Bharat & Sharma Shivani. (2009). *A Text Book of Nursing Research and Statistics.* Jaladhar S. Vikas & Co. Publishers.

21. Polit & Hungler. (1999). *Nursing Research: Principles and Methods*. Philadelphia: J.B. Lippincott Company.

22. Richard Sicree, Jonathan Shaw, Paul Zimmet. (2010). *The Global Burden Diabetes and Impaired Glucose Tolerance IDF Diabetes Atlas.* (4 Eds).

23. Ross and Wilson. (2010). *Anatomy and Physiology in health medicines*. (9 Eds). Evolve, Churchill Livingstone:

24. Sandra M.Neetina. (2009). *Manual of Nursing Practice*. (7 Eds). Philadelphia: Lippincott company

25. Susan C. Dewit, (1998*). Essentials of Medical Surgical Nursing* (4 Eds). Philadelphia: W.B. Saunders Company.

26. Suzanne. C Smeltzer . (2010). *Text Book of Medical Surgical Nursing*. (11 Eds). Philadelphia: Lippincott publications.

JOURNAL REFERENCES

1. Adamu G Bakari, Geoffrey C Onyemelukwe, Bala G Sani, Ibrahim S Aliyu, Sani S Hassan et al. (2006). Relationship between random glycemic level and body mass index in an African population. *International Journal of diabetes and metabolic disorder.* 14:144-145.

2. Agarwal AK, Jain V, Singla S, Baruah BP, Arya V, Yadav R et al. (2011). Prevalence of non alcoholic fatty liver disease and its correlation with coronary risk factors in patients with type-2 diabetes. *Journal of Association of Physicians of India*. 59: 351-4.

3. Aljasir B, Bryson M, Al-Shehri B. (2011). Regular Practice of physical exercise for the management of type-2 Diabetes Mellitus in adults: a systematic review. *Evidence-based Complementary and alternative Medicine.* 7(4): 399-408.

4. Amita S, Prabhakar S, Manoj I, Harminder S, Pavan T. (2009) Effect of yoga-nidra on blood glucose level in diabetic patients. *Indian Journal of physiology and pharmacology.* 53(1): 97-101.

5. Bijilani RL et al. (2011). A brief but comprehensive lifestyle education programbased on physical activity reduces risk factors for cardiovascular disease and diabetes mellitus. *Journal of alternative and complementary medicine.* Vol 2: 267-74.

6. Boffetta P et al. (2011). Body mass index and diabetes in Asia: a cross-sectional pooled analysis of 900,000 individuals in the Asia cohort consortium. Vol 6 (6).

7. Dr.Balaji P.A., Dr.Smitha R, Dr.Varne, and Dr. Syed Sadat Ali. (2011). Effects of yoga and exercise on metabolic parameters and anthropometry. *International Multidisciplinary Research Journal.* 1(10): 01-04.

8. Gordon LA, Morrison EY, McGrowder DA, Young R, Fraser YT et.al. (2008). Effect of exercise therapy on lipid profile and oxidative stress indicators in patients with type 2 diabetes. *BMC complementary and alternative medicine.* Vol 8:21.

9. Malhotra V, Singh S, Singh KP, Gupta P, Sharma SB, et.al (2011). Study of yoga asanas in assessment of pulmonary function in NIDDM patients. *Indian journal physiology and pharmacology*. 46(3): 313-20.

10. Malkawi, A.M. (2012). The effectiveness of physical activity in preventing type 2 diabetes in high risk individuals using well-structured interventions: *A systematic review journal of diabetology.* 2:1

11. Malkotra V et al. (2011). The beneficial effect of complementary therapy in diabetes. *Nepal Medical College Journal.* 7(2). 145-7.

12. McPherson ML, Smith SW, Powers A, Zuckerman IH. (2008). Association between diabete's patients knowledge about medications and their glucose control. 4(1): 37-45.

13. Moorthi C, Rachel P, Saravanan B, Senthilkumar N, Senthilkumar C. (2011) Factors contribute to uncontrolled diabetes in diabetic population. *Res J Pharm Biol Chem Sci* 2(2):170-84.

14. Patel M, Patel IM, Patel Ym, Rathi Sk (2011). A hospital- based observational study of type 2 diabetic subjects from Gurarat. India: *Journal of Health Population & Nutrition*. Vol 29 (3): 265-72.

15. Rothman RL, Mulvaney S, Elasy TA, Vander Woude A, Gebretsadik T et al. (2008). Self – management behaviors, racial disparities, and glycemic control among adolescents with type 2 diabetes. 121(4).

16. Sahay BK. (2007). Role of yoga in diabetes. *Journal of association of physician India*. Nov 25. 55. 121-6

17. Shalini S, Latha Venkatesan, Anita Ben (2006). Effectiveness of structured teaching programme on home care management of diabetes malliyus. *Nightingale Nursing Times*. 4-7.

18. Sarah W, Gojka R, Anders G, Richard S, Hilary K. Global (2004). Prevalence of diabetes, estimates for the year 2000 and projections for 2030. *Diabetes Care* 27(5):1047-1053.

19. Senthil P Kumar, Prabha Adhikari, PS Jeganathan. (2011). Physical Activity in the Prevention and Treatment of Type-2 Diabetes Mellitus and its Complications- A Critical Review of Reviews.*Indian Journal of Ancient Medicine and Yoga.* Volume 4. 3-4.

20. Shaw JE, Sicree RA, Zimmet PZ. (2010). Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Res Clinical Practice* 87(1).

21. Shivananda Nayak, Arun Maiya, and Manjunath Hande. (2005). Influence of aerobic treadmill exercise on blood glucose Homeostasis in noninsulin dependent diabetes mellitus patients. *Indian Journal of Clinical Biochemistry. 20 (1)*

22. Sierra, G N. (2009). The global pandemic of diabetes. *African Journal of Diabetes Medicine.*

23. Singh RB.et al. (2011). Social class and all-cause mortality in an urban population of North. India: 60 (6). 611- 17

24. Stevenson CR, Forouhi Ng, Roglic G, Williams BG, Lauer JA, Dye C, et al (2011). Diabetes and tuberculosis: the impact of the diabetes epidemic on tuberculosis incidence. BMC Public Health. 7:234.

25. Thangapandiyan Ganagavalli Subramaniyan, Natarajan Subramaniyan, Morrthi Chidambarm. (2012). Brisk walking and yoga as adjuvant Therapy in management of type 2 diabetes mellitus. *International Journal of students' research.* Vol 2 (1)

26. Van Dijk JW, Tummers K, Stehouwer CD, Hartgens F, Van Loon LJ. (2008). Exercise therapy in type 2 diabetes: is daily exercise required to optimize glycemic control.

27. Yusuf MI, Sulaiman AR, Muslim DAJ. (2007). Diabetic foot complications: A two-year review of limb amputation in a Kelantanese population. *Singapore Med J.* 48(8):729-32.

NET REFERANCES

1. http://www.ccn.aacnourals.org
2. http://www.clincaltrials.gov
3. http://www.currentnursing.com
1. http://health.allrefer.com/health/nursing assessment-info.html
2. http://www.medscape.com
3. http://www.ncbi.nlm.nih.gov
4. http://www.nursingtimesnet
5. http://www.pubmed.com
6. http://www.sciencedirect.com
7. http://www.thecochranelibrary.com
8. http://www.tnhealth.org
9. http://www.wikipedia.com
10. http://www.ncbi.nlm.nih.gov/pubmed

Appendices

APPENDIX – I

PERMISSION LETTER TO CONDUCT PILOT STUDY IN GRH MADURAI

From

P.Ramjan Begam
M.Sc (N) II year student
College of Nursing
Madurai Medical College, Madurai - 20

To

The professor and Head of the Department
Department of Diabetology
Government Rajaji Hospital, Madurai - 20

Through : The proper Channel

Respected Sir,

Sub : College of Nursing, Madurai Medical College, Madurai – M.Sc., (N) I year Medical & Surgical Nursing Student – Permission for conducting pilot study in Diabetic OPD at Government Rajaji Hospital – requested – regarding.

I, Mrs. P.Ramjan begam,M.Sc (N) I year student, College of Nursing, Madurai Medical College, Madurai in fulfillment of M.Sc., Nursing course, have a plan to conduct a pilot study on topic mentioned below at Diabetic OPD, Government Rajaji Hospital, Madurai – 20. I assure that I will not interfere with the routine activity of the department.

The topic is **"A study to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type II diabetes mellitus at diabetic OPD, GRH, Madurai"**.

Kindly consider my request and permit me to conduct the pilot study from 1.8.14 to 7.8.14.

Thanking you,

Yours faithfully,

Ramjan'D.

(P.RAMJAN BEGAM)

31.7.14

Madurai-20

Forwarded
S P
31/7/14
Principal
COLLEGE OF NURSING
Madurai Medical College
Madurai-20.

PROFESSOR AND HEAD
DEPARTMENT OF MEDICINE
MADURAI MEDICAL COLLEGE
MADURAI-625 020.

PERMISSION LETTER TO CONDUCT DISSERTATION STUDY IN GRH MADURAI

From

P.Ramjan Begam
M.Sc (N) I year student
College of Nursing
Madurai Medical College, Madurai - 20

To

The Professor and Head of the Department,
Department of Diabetology
Government Rajaji Hospital,
Madurai - 20.

Through: The proper Channel

Respected Sir,

Sub : College of Nursing, Madurai Medical College, Madurai – M.Sc., (N) I year Medical & Surgical Nursing Student – Permission for conducting study in Diabetic OPD at Government Rajaji Hospital – requested – regarding.

I, Mrs. P.Ramjan begam, M.Sc (N) I year student, College of Nursing, Madurai Medical College, Madurai in partial fulfillment of M.Sc., Nursing course, have a plan to conduct a dissertation study on topic is **"A study to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type II diabetes mellitus at diabetic OPD, GRH, Madurai-20".** I assure that I will not interfere with the routine activity of the department.

Kindly consider my request and permit me to conduct the study.

Thanking you,

Yours faithfully,

DATE: 24-11-2013
MADURAI

Ramjan P.
(P.RAMJAN BEGAM)

Forwarded
S.P
24/12/13
Principal i/c
COLLEGE OF NURSING
Madurai Medical College
Madurai-20.

Forwarded

Asst. Professor of Diabetology

Permitted
PROFESSOR AND HEAD
DEPARTMENT OF DIABETOLOGY
MADURAI RAJAJI GOVT. HOSPITAL
MADURAI-625 020.

APPENDIX – II

ETHICAL COMMITTEE APPROVAL LETTER

Ref. No. 68/E4/2/2014 **Govt. Rajaji Hospital, Madurai.20. Dated: 02.2014**

Institutional Review Board / Independent Ethics Committee.
Captian. Dr. B. Santhakumar, M.D., (F.M.,)
Dean, Madurai Medical College &
Govt Rajaji Hospital, Madurai 625020. **Convenor**

Sub: Establishment-Govt. Rajaji Hospital, Madurai-20-
Ethics committee-Meeting Minutes- for January 2014
Approved list -regarding.

The Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held on 20.1.2014, Monday at 10.00 am to 12.00.noon at the Anaesthesia Seminar Hall, Govt. Rajaji Hospital, Madurai. The following members of the committee have attended the meeting.

1.Dr. V. Nagarajan, M.D., D.M (Neuro) Ph: 0452-2629629 Cell.No 9843052029	Professor of Neurology (Retired) D.No.72, Vakkil New Street, Simmakkal, Madurai -1	Chairman
2. Dr.Mohan Prasad , M.S M.Ch Cell.No.9843050822 (Oncology)	Professor & H.O.D of Surgical Oncology(Retired) D.No.72, West Avani Moola Street, Madurai -1	Member Secretary
3. Dr. Parameswari M.D (Pharmacology) Cell.No.9994026056	Director of Pharmacology Madurai Medical College	Member
4. Dr.S. Vadivel Murugan, MD., (Gen.Medicine) Cell.No 9566543048	Professor of Medicine Madurai Medical College	Member
5. Dr.S. Meenakshi Sundaram, MS (Gen.Surgery) Cell.No 9842138031	Professor & H.O.D of Surgery Madurai Medical College	Member
6. Mrs. Mercy Immaculate Rubalatha, M.A., Med., Cell. No. 9367792650	50/5, Corporation Officer's quarters, Gandhi Museum Road, Thamukam, Madurai-20	Member
7. Thiru.Pala. Ramasamy , BA.,B.L., Cell.No 9842165127	Advocate, D.No.72.Palam Station Road, Sellur, Madurai -2	Member
8. Thiru. P.K.M. Chelliah ,B.A Cell.No 9894349599	Businessman, 21 Jawahar Street, Gandhi Nagar, Madurai-20	Member

The following Project was approved by the committee

..2..

Name of P.G.	Course	Name of the Project	Remarks
P. Ramjan Begam	M.Sc. Nursing, College of Nursing, Madurai Medical College, Madurai	A study to evaluate the effectiveness of Brisk walking exercise on glycemic level among patients with type 2 diabetes mellitus at diabetic outpatient department, Government Rajaji Hospital, Madurai-20.	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain it Confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution or to Government.
2. She/He should inform the institution Ethical Committee, in case of any change of study procedure, site and investigation or guide.
3. She/He should not deviate the area of the work for which applied for Ethical clearance. She/He should inform the IEC immediately, in case of any adverse events or Serious adverse reactions.
4. She/He should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and if any Extension of time is required He/She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the work or on completion.
8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

Member Secretary **Chairman**
Ethical Committee

26.2.14
DEAN/Convenor
Govt. Rajaji Hospital,
Madurai- 20.

6/2/14

To
The above Applicant
-thro. Head of the Department concerned

APPENDIX – III

CONTENT VALIDITY CERTIFICATES

CERTIFICATE OF VALIDATION

This is to certify that the tool

SECTION A – Demographic data

SECTION B – Assessment of patient's glycemic level by Bio physiological Measurement

Prepared for data collection by RAMJAN BEGAM.P, II year M.Sc. (N) student, College of Nursing, Madurai Medical College, Madurai, who has undertaken the study field on thesis entitled **"A STUDY TO EVALUATE THE EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT DIABETIC OPD, GRH, MADURAI"** has been validated by me.

SIGNATURE OF THE EXPERT

NAME : PROFESSOR AND HEAD DEPARTMENT OF MEDICINE MADURAI MEDICAL COLLEGE MADURAI-625 020.

DESIGNATION :

DATE :

CERTIFICATE OF VALIDATION

This is to certify that the tool

SECTION A – Demographic data

SECTION B – Assessment of patient's glycemic level by Bio physiological Measurement

Prepared for data collection by RAMJAN BEGAM.P, II year M.Sc. (N) student, College of Nursing, Madurai Medical College, Madurai, who has undertaken the study field on thesis entitled **"A STUDY TO EVALUATE THE EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT DIABETIC OPD, GRH, MADURAI"** has been validated by me.

SIGNATURE OF THE EXPERT

NAME : G. Jaya Thangaselvi

DESIGNATION : HOD - Med - Surg Dept

DATE : 29/7/2014

CERTIFICATE OF VALIDATION

This is to certify that the tool

SECTION A – Demographic data

SECTION B – Assessment of patient's blood sugar level by Bio-physiological Measurement.

Prepared for data collection by RAMJAN BEGAM.P, II year M.Sc. (N) student, College of Nursing, Madurai Medical College, Madurai, who has undertaken the study field on thesis "**EVALUATE THE EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT DIABETIC OPD, GRH, MADURAI"** has been validated by me.

SIGNATURE OF THE EXPERT

Head of the Department
Medical Surgical Nursing
Dhanalakshmi Srinivasan College of Nursing
Perambalur - 621 212.

NAME:

DESIGNATION: Associate Professor

DATE: 07/08/14.

CERTIFICATE OF VALIDATION

This is to certify that the tool

SECTION A – Demographic data

SECTION B – Assessment of patient's blood sugar level by Bio-physiological Measurement.

Prepared for data collection by RAMJAN BEGAM.P, II year M.Sc. (N) student, College of Nursing, Madurai Medical College, Madurai, who has undertaken the study field on thesis "**A STUDY TO EVALUATE THE EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT DIABETIC OPD, GRH, MADURAI"** has been validated by me.

L. Anand

SIGNATURE OF THE EXPERT

NAME: L.ANAND

DESIGNATION: LECTURER,
College of Nursing,
NEIGRIHMS,
Shillong

DATE: 08.08.14

CERTIFICATE OF VALIDATION

This is to certify that the tool

SECTION A – Demographic data

SECTION B – Assessment of patient's glycemic level by Bio physiological Measurement

Prepared for data collection by RAMJAN BEGAM.P, II year M.Sc. (N) student, College of Nursing, Madurai Medical College, Madurai, who has undertaken the study field on thesis entitled **"A STUDY TO EVALUATE THE EFFECTIVENESS OF BRISK WALKING EXERCISE ON GLYCEMIC LEVEL AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT DIABETIC OPD, GRH, MADURAI"** has been validated by me.

SIGNATURE OF THE EXPERT

NAME : Dr. B. SARA.

DESIGNATION : Reader in Nursing.

DATE :

APPENDIX-IV

INFORMED CONSENT FORM

ஒப்புதல் அறிக்கை

பெயர்: **நாள்:**

எனக்கு இந்த செவிலிய ஆய்வினைப் பற்றிய முழு விவரம் விளக்கமாக எடுத்துரைக்கப்பட்டது. இந்த ஆய்வில் பங்குகொள்வதில் உள்ள நன்மைகள் மற்றும் தீமைகள் பற்றி முழுமையாக புரிந்துகொண்டேன். இந்த ஆய்வில் தானாக முன் வந்து பங்குபெறுகிறேன். மேலும் எனக்கு இந்த ஆய்வீலிருந்து எந்த சமயத்திலும் விலகிக கொள்ள முழு அனுமதி வழங்கப்பட்டுள்ளது. என்னுடைய பெயர் மற்றும் அடையாளங்கள் ரகசியமாக வைத்துக்கொள்ளப்படும் என்றும் எனக்கு உறுதியளிக்கப்பட்டுள்ளது.

கையொப்பம்

APPENDIX – V

RESEARCH TOOL
PART-I

DEMOGRAPHIC DATA

1. Age
    a) 31-35 years [ ]
    b) 36-40 years [ ]
    c) 41- 45 years [ ]
    d) 46 - 50 years [ ]

2. Gender
    a) Male [ ]
    b) Female [ ]

3. Religion
    a) Hindu [ ]
    b) Christian [ ]
    c) Muslim [ ]
    d) Others [ ]

4. Educational status
    a) No formal education [ ]
    b) Primary [ ]
    c) High school [ ]
    d) Graduate [ ]

5. Nature of Job
    a) Sedentary [ ]
    b) Moderate [ ]
    c) Heavy [ ]

6. Family monthly income

a) 3000-4000 [ ]
b) 4001-5000 [ ]
c) 5001 -6000 [ ]
d) Above 6000 [ ]

7. Marital status

a) Married [ ]
b) Unmarried [ ]
c) Widow/Widower [ ]
d) Separated [ ]

CLINICAL DATA

8. Duration of illness

a) 1-2 years [ ]
b) 3-4years [ ]
c) 5-6years [ ]
d) More than 6 years. [ ]

9. History of Diabetic mellitus in your family

a) Parents [ ]
b) Parental relatives [ ]
c) No family history [ ]

10. Your drugs for Diabetic mellitus

a) Metformin [ ]
b) Glipizide [ ]
c) Glibenclamide [ ]
d) Others _____

11. History of Previous Hospitalization

a) Hypoglycemia [ ]
b) Hyperglycemia [ ]
c) Others [ ]

12. Type of diet

a) Vegetarian [ ]

b) Non – vegetarian [ ]

13. History of taking prescribed diet for Diabetes Mellitus

a) Regularly [ ]

b) Irregularly [ ]

c) Rarely [ ]

d) Not taken [ ]

14. Interval of monitoring the blood sugar level

a) Monthly once [ ]

b) Two months once [ ]

c) Three months once [ ]

d) Occasionally [ ]

15. Body mass Index (weight/meter^2) ----------

a) Weight of the patient ----------

b) Height of the patient ----------

PART – II

It consists of the assessment of patient's glycemic level by bio-physiological measurement. (Glucometer)

Monitoring of glycemic level	Date	Time	Finding (mg / dl)	
			Pretest	Post test
			Day 1	Day 28
Fasting glycemic level				

APPENDIX – VI

பகுதி - அ

தனிப்பட்ட விபரங்கள்

மாதிரி எண்:

பின்வருவனவற்றை மிகவும் கவனமாக படித்து பொருத்தமானவற்றை சரியான இடத்தில் (✓) குறிப்பிடவும்.

1. வயது

அ. 31 - 35 வயது [ ]

ஆ. 36 - 40 வயது [ ]

இ. 41 –45 வயது [ ]

ஈ. 46 –50 வயது [ ]

2. பாலினம்

அ. ஆண் [ ]

ஆ. பெண் [ ]

3. மதம்

அ. இந்து [ ]

ஆ. கிறிஸ்தவம் [ ]

இ. இஸ்லாம் [ ]

ஈ. மற்றவை [ ]

4. கல்வித்தகுதி

அ. அணுபவக்கல்வி [ ]

ஆ. தொடக்கநிலை கல்வி [ ]

இ. மேல்நிலைக்கல்வி [ ]

ஈ. பட்டதாரி [ ]

5. பணியின் தன்மை

அ. எப்பொழுதும் உட்கார்ந்து செய்யும் பணி [ ]

ஆ. மிதமான பணி [ ]

இ. கடினமான பணி [ ]

6. Á¡¾ ÅÕÁ¡ Éõ

« . 3000-4000 [ ]

¬ . 4001-5000 [ ]

þ . 5001-6000 [ ]

®. > 6000. [ ]

7. ¾ÕÁ½ ¿ ¨ Ä

« . ¾ÕÁ½ Á¡ É Å÷ [ ]

¬ . ¾ÕÁ½ Á¡ ¸¡¾Å÷ [ ]

þ . Å¾ ¨ Å / Á ¨ É Å ¨ Â þÆó¾Å÷ [ ]

®. ¾É Â¡ Å¡úÀÅ÷. [ ]

§¿¡ö º¡÷ó¾ Å ÀÃ í ¸û

8. §¿¡Â ý ¸¡Äõ

« . 1-2 ÅÕ¼ í ¸û [ ]

¬ . 3-4 ÅÕ¼ í ¸û [ ]

þ . 5-6 ÅÕ¼ í ¸û [ ]

®. 6 ÅÕ¼ í ¸ Ù ì Ì §Áø. [ ]

9. Ì Î õÀ « í ¸ò¾ É Õû Â¡Õ ì ¸¡ÅÐ º÷ì ¸ ¨ Ã §¿¡ö ¯ûÇÐ ÀüÈ Â Å ÀÃõ

« . ¦Àü§È¡÷ ¸û [ ]

¬ . ¦Àü§È¡÷ ÅÆ ¯ÈÅ É÷ ¸û [ ]

þ . Â¡Õ ì Ì õ þ ø ¨ Ä [ ]

10. ¿ í ¸û º÷ì ¸ ¨ Ã §¿¡ö ì ¸¡ ¸ ± Î òÐ ì ¦ ¸¡ û Ù õ ÁÕóÐ

« . ¦ÁðÀ¡÷Á ý [ ]

¬ . ¸¡ ¨ ÇÀ ¨ ƒ Î [ ]

þ . ¸¡Ç ¦À í ¸¡Ç¡ ¨ Á Î [ ]

®. ÁüÈ ¨ Å. _____

11. þ¾ü Ì Óý Ò ÁÕòÐÅÁ¨ ÉÂ¢ø « ÛÁ¾¢ì ¸Àð¼¾ü¸¡É ¸¡Ã½õ.

« . þÃò¾º÷ì ¸¨Ã Ì ¨È [ ]

¬ . þÃò¾º÷ì ¸¨Ã Á¢¨ ¸ [ ]

þ . ÁüÈ¨ Å _____

12. ¯½ ×ô ÀÆì ¸õ

« . ¨ºÅõ [ ]

¬ . « ¨ºÅõ [ ]

13. º÷ì ¸¨Ã §¿¡öì ¸¡É ¯½ ×Ó¨È ¸¨¼À¢ÊôÀÐ ÀÈ¢È¢Â Å¢ÀÃõ

« . ¦¾¡¼÷îº¢Â¡ ¸ [ ]

¬ . þ ¨¼¦ÅÇ¢ Å¢ð Î [ ]

þ . ±ô§À¡¾¡ÅÐ [ ]

®. þø¨Ä [ ]

14. þÃò¾ò¾¢ý º÷ì ¸¨Ã «Ç¨Å ¸ñ ¸¡½¢ì Ì õ ¸¡Ä «Ç×

« . Á¡¾ò¾üì Ì ´ÕÓ¨È [ ]

¬ . þÃ ñ Î Á¡¾ò¾üì Ì ´ÕÓ¨È [ ]

þ . ã ý Ú Á¡¾ò¾üì Ì ´ÕÓ¨È [ ]

®. ±ô§À¡¾¡ÅÐ ´ÕÓ¨È [ ]

15. ¯¼ø ¿¢¨È Ì È¢Â¢ð¦¼ ñ _____

« . ±¨¼Â¢ý «Ç× _____

¬ . ¯ÂÃò¾¢ý «Ç× _____

APPENDIX VII

CERTIFICATE OF ENGLISH EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation **"A study to evaluate the effectiveness of brisk walking exercise on glycemic level among patients with type II diabetes mellitus at diabetic OPD,GRH,Madurai"** done by Mrs.P.Ramjanbegam, II year M.Sc.,Nursing student, College of Nursing, Madurai Medical College, Madurai-20 has been edited for English language appropriateness.

Name: T. VENKATESH

Signature

Designation: Graduate Teacher (English)

Institution: Muthalamman Hindu High School, Vadapudupatty, Annanji (po), Periyakulam (Tk), Theni (Dt), PIN: 625 531.

T. VENKATESH B.Sc., B.Ed., M.Phil., MA (Eng)
English Graduate Teacher
Muthalamman Hindu High School
Vadapudupatty, Annanji Post
Periyakulam Tk., Theni Dt- 625 531

APPENDIX - VIII

CERTIFICATE OF TAMIL EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation **"a study to evaluate the effectiveness of Brisk walking exercise on glycemic level among patients with type 2 diabetes mellitus at diabetic outpatient department, Government Rajaji Hospital, Madurai** "done by Mrs.P.Ramjan begam, M.Sc., Nursing II year student, College of Nursing, Madurai Medical College, Madurai - 20 has been edited for Tamil language appropriateness.

Name: க. நாகசுந்தினி

Designation: தமிழ் இணைப்போசிரியர்

Institution: எம். வி. எம். அரசு மகளிர் கலைக்கல்லூரி திண்டுக்கல்.

க. நாகசுந்தினி

Signature

முனைவர். க. நாகசுந்தினி எம்.ஏ.,எம்.ஃபில்.,பிஎச்.டி.,
தமிழ் இணைப்போராசிரியர்,
எம்.வி.எம். அரசு மகளிர் கலைக்கல்லூரி,
திண்டுக்கல்

APPENDIX - IX

PROCEDURE

BRISK WALKING EXERCISE

Introduction to Brisk walking exercise

Take a walk! Walking is an easy, effective, and low-cost form of aerobic exercise for people with type 2 diabetes.

Brisk walking is an aerobic physical exercise which is indented to give control over the body. Brisk walking has been utilized as a therapeutic tool to achieve positive health and cure disease. Many studies has shown the effect of brisk walking on hypertension, diabetes, obesity and other common ailments have been carried out. Brisk walking exercise plays a major role in the prevention and control of insulin resistance, pre-diabetes, GDM, type 2 diabetes, and diabetes-related health complications. It improves insulin action and can assist with the management of BG levels, lipids, BP, CV risk, mortality, and QOL.

Brisk walking – meaning

The Centers for **Disease Control and Prevention (CDC)** says that brisk walking is at a pace of three miles per hour or more (but not race walking) or roughly 20 minutes per mile. That equates to about five kilometers per hour or 12 minutes per kilometer.

Brisk walking is a type of aerobic physical exercise, walking at a pace of 12 minutes per kilometer. (2.5 kilometer per day). People want to receive health benefits from brisk walking exercise should work out for 30 minutes a day at least five days of the week.

Walking for fitness requires no special equipment other than a good pair of shoes and perhaps some reflective clothing. Need is a street, sidewalk, shopping mall, or even the hallways of the own home.

The earliest hours in the morning would probably give fresh oxygen and quality time to spend with the greenery and beauty around.

Walking can be a whole philosophy of life. After all, from the moment we rise in the morning till we climb into bed at night, we are on and off our feet.

Benefits of brisk walking;

The benefits of walking in general include:

- Lowering blood glucose levels
- Improving the body's ability to use insulin
- Reducing risk of heart disease or stroke
- Raising good cholesterol levels while lowering bad cholesterol levels
- Lowering stress levels
- Strengthening muscles and bones
- Brisk walking also burns more calories

Couple of benefits of brisk walking:

- It helps to fight against stress, by providing complete relaxation to the mind.
- It protects from the clutches of diseases like osteoporosis, colon cancer, constipation etc.
- It increases the longevity of life, by maintaining fitness.
- It helps in reducing the problem of depression, thus enabling to derive mental peace.

- It relieves from backache trouble and also acts as a great remedy for arthritis problem.
- It helps in increasing flexibility, by strengthening the muscles, bones and joints, thereby toning the body.
- It ensures that have a proper sleep at night.

FREQUENCY

Once a day, in the morning

DURATION

30 Minutes duration.

NEED

- ❖ **Comfortable shoes or chapels**
- ❖ **Comfortable dress**
- ❖ Diabetes complications can lead to a loss of sensation in the extremities. This makes getting good shoes a critical part of a walking program. Person need shoes with a firm heel, solid arch support, and thick flexible soles to cushion feet and absorb shock. They should fit the shape of feet and limit the motion of the joints. Otherwise need comfortable chapels.

PROCEDURE FOR BRISK WALKING

- ✓ Explain the procedure and its benefits to the clients.
- ✓ Researcher demonstrated the brisk walking exercise.

STEP-1, **Warm up phase**

Beginning with gentle warm-up. To take one deep breathe, hold 5 seconds and exhale slowly. Then perform some light stretching of the body muscles gently.

STEP-2,**Working phase**

- **Start with slow then pick up the speed by increasing steps.**
- Heel of the foot should hit the ground first with every stride, with the rest of the foot contacting the ground as roll the weight forward. Keep the toes pointed forward, chin up, shoulders back when walk.
- Focus eyes five to six meters ahead and keep shoulders relaxed. Bend elbows at a 90 degree angle and cup hands lightly, rather than clenching the fists.
- Be sure to swing the arms
- Leading with the heel, take a step forward with right foot and move arms in opposition (i.e. as left arm moves forward, right moves back). Transfer weight through the heel of right foot
- Try to get into a pattern, counting the number of steps to each in-and-out breath.

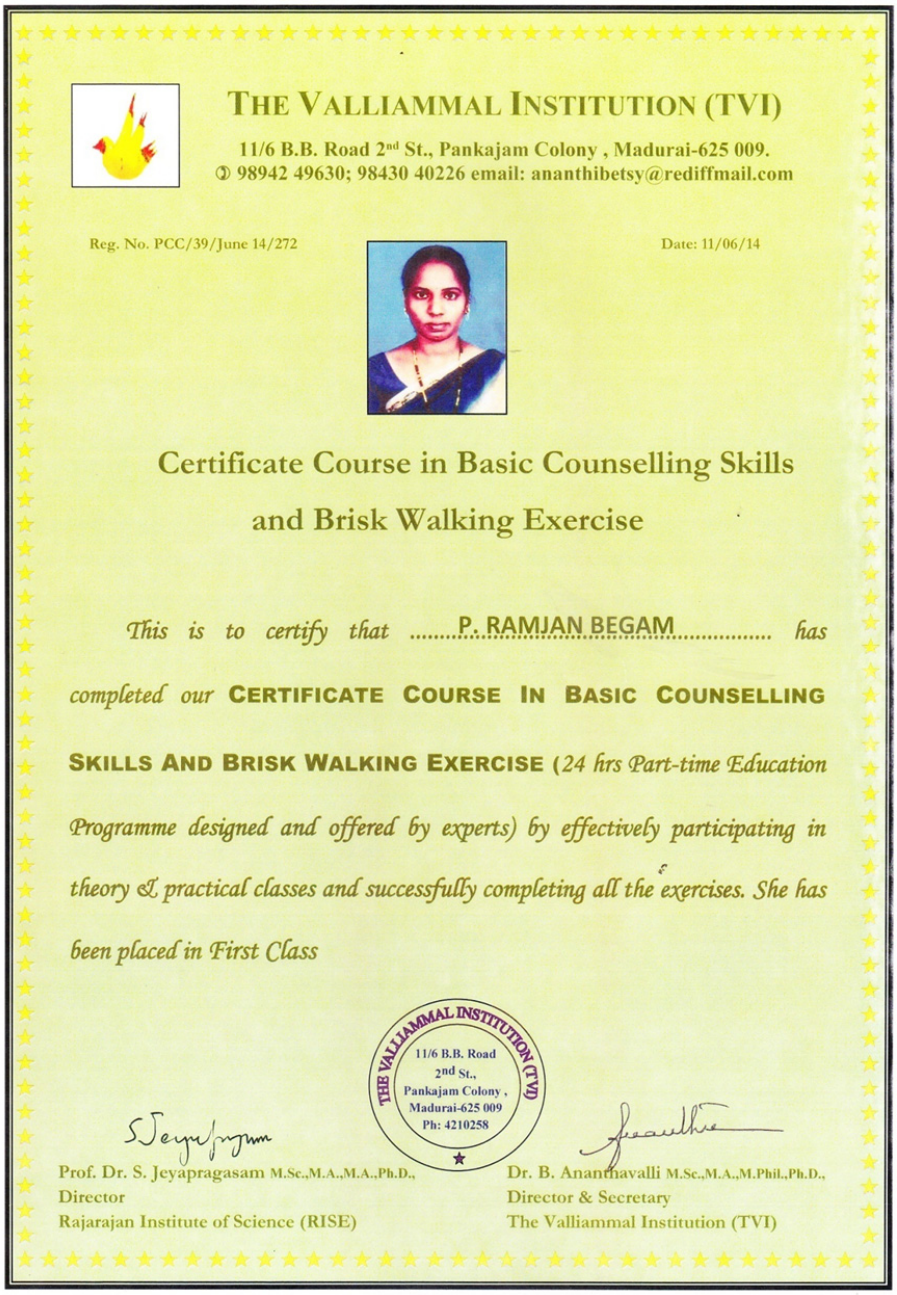
STEP-3, Cool down phase

- At the end of each walking session. Relax for 1 minute, then do muscle stretching exercise (Hands up, stretching back, bending forward, sitting and move the legs).
- Finally, rub the palms until feel the heat, then touch over the face, ears and neck.
- Repeat 3 times. It gives more freshness.

INSTRUCTIONS

- ✓ While walking do not take too much of liquids. Sips of water allowed.
- ✓ Too much of talk to be avoided.
- ✓ Bending forward, turn left and right should be avoided.

APPENDIX X
TRAINING CERTIFICATE FOR BRISK WALKING EXERCISE



THE VALLIAMMAL INSTITUTION (TVI)

11/6 B.B. Road 2nd St., Pankajam Colony , Madurai-625 009.
✆ 98942 49630; 98430 40226 email: ananthibetsy@rediffmail.com

Reg. No. PCC/39/June 14/272

Date: 11/06/14

Certificate Course in Basic Counselling Skills and Brisk Walking Exercise

This is to certify that .....P. RAMJAN BEGAM..... *has completed our* **CERTIFICATE COURSE IN BASIC COUNSELLING SKILLS AND BRISK WALKING EXERCISE** *(24 hrs Part-time Education Programme designed and offered by experts) by effectively participating in theory & practical classes and successfully completing all the exercises. She has been placed in First Class*

THE VALLIAMMAL INSTITUTION (TVI)
11/6 B.B. Road
2nd St.,
Pankajam Colony ,
Madurai-625 009
Ph: 4210258

Prof. Dr. S. Jeyapragasam M.Sc.,M.A.,M.A.,Ph.D.,
Director
Rajarajan Institute of Science (RISE)

Dr. B. Ananthavalli M.Sc.,M.A.,M.Phil.,Ph.D.,
Director & Secretary
The Valliammal Institution (TVI)

QUALITY CONCEPTS
67, 1st Floor, P&T Nagar Main Road,
P&T Nagar, Madurai - 625 017.
Tel : 91-452-4231644
E-mail : qualityconcepts@in.com

CALIBRATION CERTIFICATE

01. Certificate No. & Date : 20140606 02.08.2014
02. Page no. : 01 of 01

03.Name of the Client : **P.Ramjan Begam,**
II Year MSC Nursing, Madurai.

04.Name of the Instrument : Glucometer

05.Identification No. of the instrument : GU02666930

06.Range of the instrument : 10 to 600 mg/dl

07. Least Count : 1 mg/dl

08.Make : Accu Check

09.Calibrated on : 01.08.2014

10.Next Calibration due on : 01.08.2015 (User defined)

11.Standards Followed : -

12. Calibration Results

Sl. No.	Indicated Value mg/dl	Standard Value mg/dl	Error mg/dl
01	51	50	1
02	112	110	2
03	204	200	4
04	302	300	2
05	382	380	2

13. Calibration Traceable to : STANDARD SOLUTIONS

14. Allowable Tolerance : ± 10 mg/dl (user defined)

15. Instrument status : Deviations are within specified limits

Note: Calibrated and certified for ISO and other Quality System Standards' requirement. The results were observed at the time of calibration.

Calibrated by
Signature :
Designation : Chief Technician

QUALITY CONCEPTS * MADURAI *

Approved by
Signature :
Designation : Director

APPENDIX – XI

PHOTOGRAPHS


120
DEPARTMENT OF DIABETOLOGY